Friden

CALCULATING MACHINE ADJUSTMENT MANUAL

MODELS

STW-ACG . . . . ST
SW . . . . S
CW C
DW . . . . D

FRIDEN, INC.
HOME OFFICE AND PLANT · SAN LEANDRO, CALIFORNIA
SALES AND SERVICE THROUGHOUT THE WORLD

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SAN LEANDRO, CALIFORNIA

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PREFACE

This Adjustment Manual has been designed to include all the adjustments for the Friden ''W'' Line electric Model Calculator. These adjustments supersede those listed in the Service Manuals that are dated prior to this manual. The adjustments are principally for the ''W'' Line Models. However, the manual includes those adjustments that apply to the Friden ''Grayline'' models (models having a gray case).

The manual does not include the adjustments for the early Friden machines. Information on these early Friden Calculators (Models A,B,C,D,F,FT) may be obtained from the General Service Department at the factory whenever required.

The adjustments for the Model SRW and the Model SBT are found in the appropriate sections of the brown covered Calculating Machine Operations and Adjustment Manual.

The adjustments are arranged so that a serviceman can start at the beginning of the manual and adjust a machine completely. If the machine is an STW and an adjustment is reached which applies to the ST, the particular adjustment is skipped. This also applies if the machine being adjusted is an ST. Those adjustments applying only to the ''W'' Line are skipped.

The adjustment clearances are given as a starting point - as a guide - for the serviceman. These clearances are believed to be the best for the proper operation of the calculator and are used by the Calculator Assembly Department.

Because the main purpose of the adjustments is to place a machine in proper operating order, please keep in mind that variables among the parts of the machine often necessitate the changing of a prescribed clearance. The changing of a clearance may be done when the machine is manufactured or it may become necessary for the serviceman to make the change. However, DO NOT change adjustments without a good cause.

Place this manual in the brown covered Calculating Machine Operations and Adjustment Manual Binder.

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HOW TO USE THIS MANUAL

Many adjustment numbers have letters such as A-B-C along side them. This identifies the sequence adjustments. You will find that some adjustments have been duplicated in two or more places in the manual. This duplication was done to reduce the necessity to cross-reference, thus keeping the adjustments in continuity.

When using the manual read each adjustment through once and check it with the sketch. Then check it with the machine. The adjustment should be read again before adjusting the machine accordingly.

Above each adjustment number is the model or models to which the adjustment applies. ALL

ALL MODELS: This adjustment applies to all models covered by this manual as indicated on the cover.
STW: The adjustment applies to the model STW only.
STW - ST: The adjustment applies to both model STW and ST.
STW - ACG - SW - SRW: The adjustment applies to these models.

The thin Arrows with tails are Motion Arrows. These are shown on or next to a part and indicate the part is in motion or is to be moved. The thick, heavy Arrows are Adjustment Arrows. They indicate the direction in which the part can be adjusted. These Arrows are placed close to the adjustment point or the part name. A single Arrow indicates the adjustment is to be made in one direction only. Two Horizontal Arrows indicate the adjustment can be made to the right or left; forward or rearward. Two Vertical Arrows indicate an up or down means of adjustment. Combination of these Arrows indicate the adjustment can be made in several directions.

Many of the sketches illustrate the tools used and the method of holding the parts for making the adjustment. These are suggested methods because there are many methods in which a part can be formed. With practice a serviceman can develop his own methods of adjusting the parts.

Because this is not a parts manual, all parts are identified by name rather than by part number. Learning the part name will assist in compiling a correct Service Report, and will help when discussing the mechanics of the machine with other servicemen.

RULE OF ECCENTRICS: Except where specifically noted, all Eccentrics should be positioned as shown in the sketches showing their adjustment. In many cases the parts adjusted by an Eccentric will not operate properly if the Eccentric is in any other position than the one shown.

Definition of Terms Used:

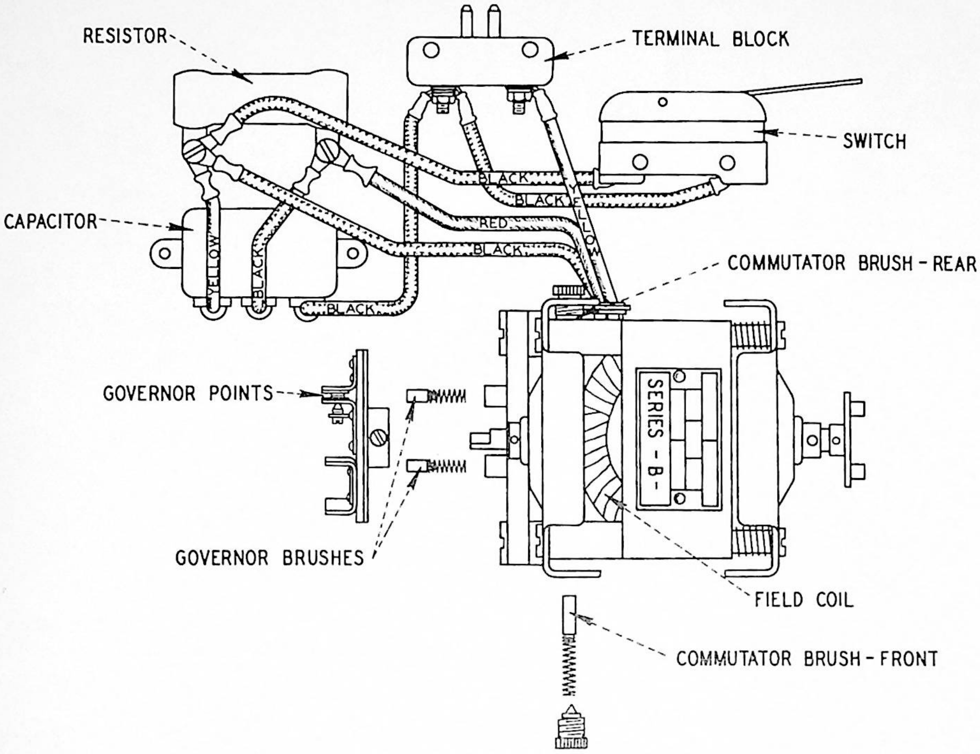
HOME POSITION: The machine is not in operation, and the parts are in their normal stationary position.

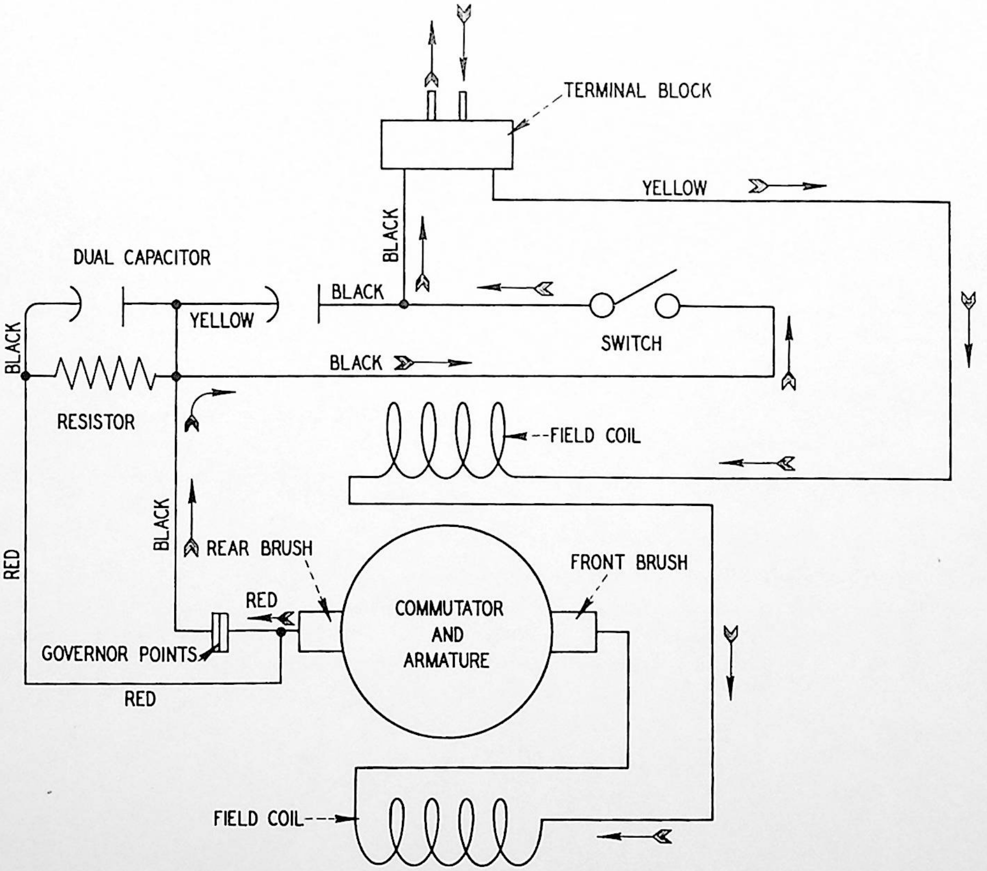
NORMAL POSITION: Machine may be in operation but certain parts, such as the Multiplier Section, etc., are not in operation.

RIGHT: Toward the Right Side Frame Assembly.

LEFT: Toward the Left Side Frame Assembly.

For example: If you are facing the rear of the machine, LEFT would be to your right. In all cases where reference is made to RIGHT or LEFT in this manual, it means toward the Right Side Frame or toward the Left Side Frame.


RESISTOR
TERMINAL BLOCK
SWITCH
CAPACITOR
YELLOW
BLACK
BLACK
BLACK
BLACK
RED
BLACK
YELLOW
COMMUTATOR BRUSH - REAR
GOVERNOR POINTS
SERIES - B -
GOVERNOR BRUSHES
FIELD COIL
COMMUTATOR BRUSH - FRONT


TERMINAL BLOCK
YELLOW
BLACK
DUAL CAPACITOR
BLACK
YELLOW
SWITCH
BLACK
BLACK
RESISTOR
FIELD COIL
BLACK
REAR BRUSH
RED
FRONT BRUSH
RED
COMMUTATOR AND ARMATURE
GOVERNOR POINTS
RED
FIELD COIL

ST - S - C - D EARLY W'S

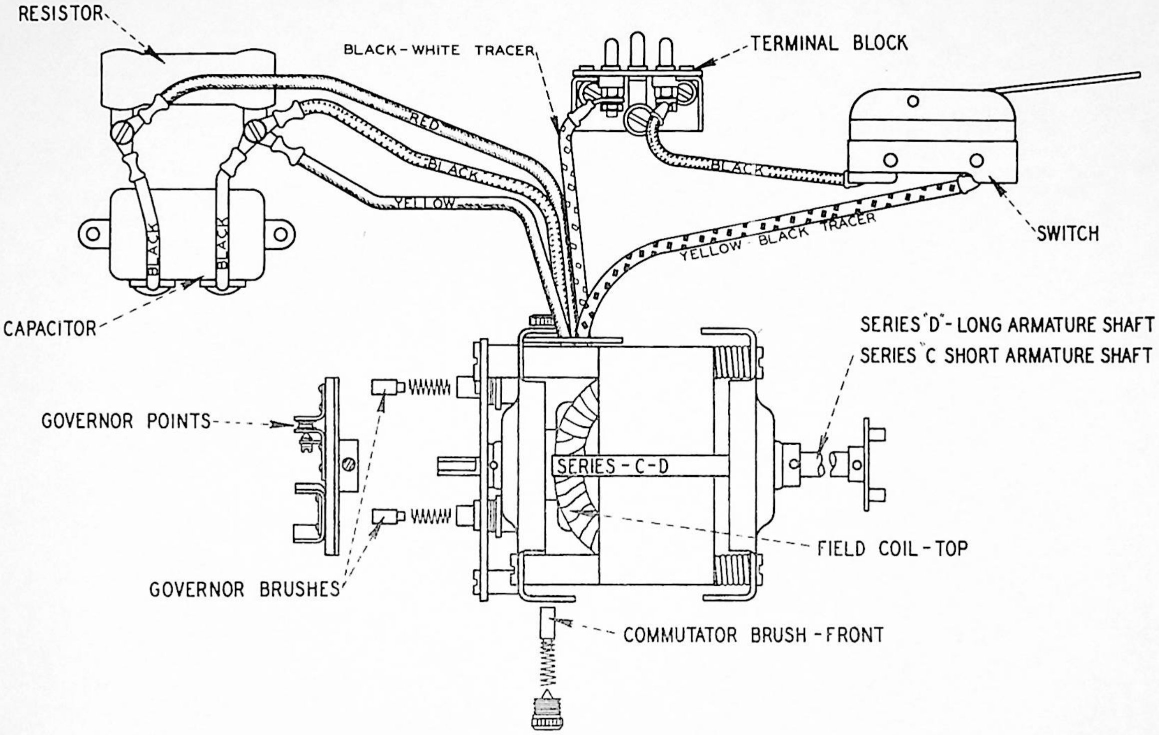
MOTOR CIRCUITRY - 3-WIRE TYPE: (The direction of current is described for one direction only of the alternating current cycle.) The current enters the Terminal Block to the Yellow Wire, to the Field Coils, to the Front Commutator Brush, to the Commutator and through the Armature Coil, to the Rear Commutator Brush to the Short Red Wire (inside the Motor) to the Front Governor Brush, to the Inside Governor Ring, through the Governor Points, to the Outside Governor Ring, to the Rear Governor Brush, to the Black Wire from the motor, (to the Resistor and the Capacitor Yellow), to the Black Lead Wire, to the Switch, to the Black Lead Wire, to the Terminal Block.

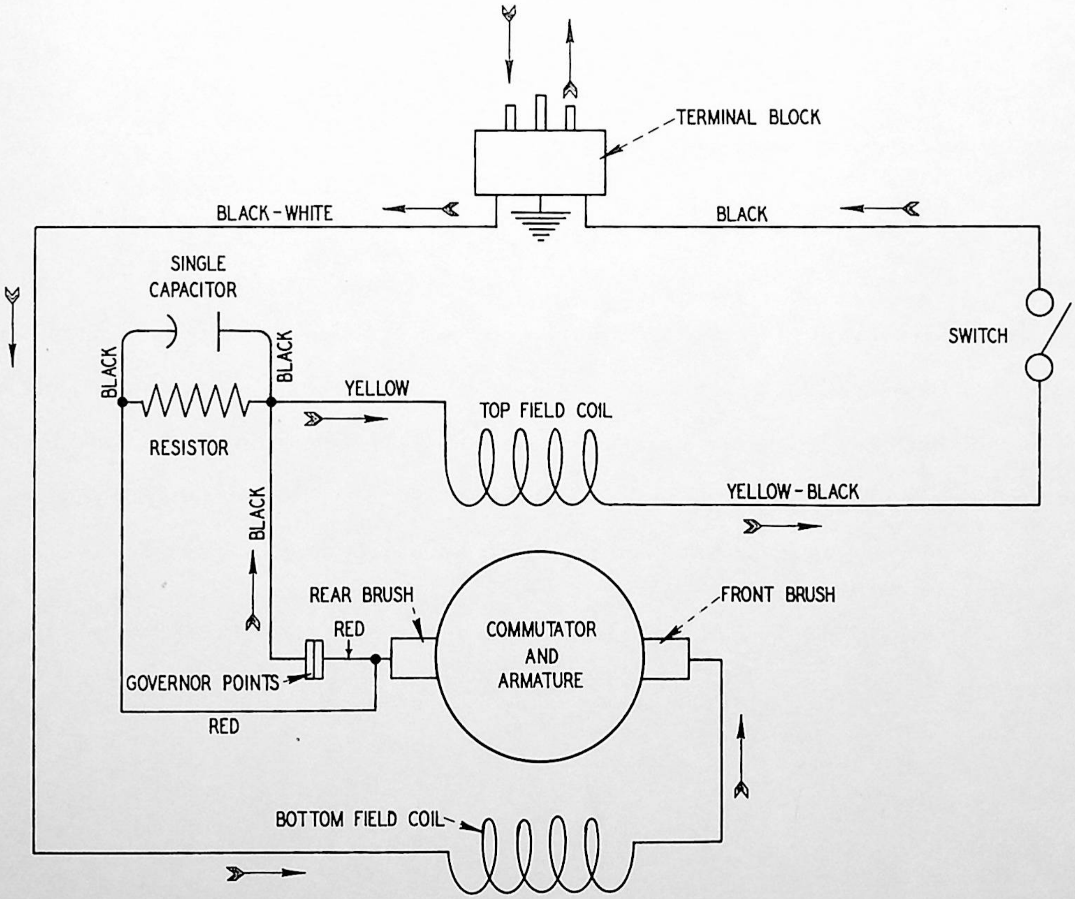
The Capacitor is wired across the motor switch and the Governor Points to reduce arcing: The Red Wire runs from the Rear Commutator Brush and connects with the Black Wire from the Capacitor at the Resistor. The Light Colored (yellow) Wire from the Capacitor is the common lead and is connected to the Resistor with the Black Wire from the Motor and the Black Lead Wire from the Switch. This circuit reduces the arcing at the Governor Points. The other Black Wire runs from the Capacitor to the Switch (this same wiring applies for the Contact Blade Type machines). Remember the Light Colored (yellow) Wire of the Capacitor is the common lead and should not be disconnected. This would eliminate the Capacitor from the circuit.

The purpose of the Resistor is to cut down voltage when it is connected in series with a motor. As soon as the Motor rotates fast enough to cause the Governor Points to open, current can no longer flow through the Governor Points. Instead, it has only one path to follow and that is the path through the Resistor. Since the Resistor cuts down the voltage to the Motor, the Motor slows down, and when it slows down, the Governor Points are allowed to close again. As soon as the Governor Points close again, the current now will pass directly to the motor again, and the Motor receives full voltage. Causing the Motor to speed up again, this process repeats as long as the Switch is closed.

Note: A Split Ring Governor is preferable when the current is 115 V DC but will not function satisfactorily on 230 V DC.

ADJUSTMENTS





STW - ACG - SW - CW - DW - SRW

MOTOR CIRCUITRY - 5 WIRE TYPE: (The direction of the current is described for one direction only of the alternating current cycle.) The current enters the Terminal Block, to the Black-White Wire, to the Bottom Field Coil, to the Front Commutator Brush, to the Commutator and through the Armature Coil, to the Rear Commutator Brush, to the Short Red Wire (inside the motor), to the Front Governor Brush, to the Inside Ring, through the Governor Points, to the Outside Ring, to the Rear Governor Brush, to the Black Wire from the motor, (to the Resistor and Capacitor Black Wire), to the Yellow Wire, to the Top Field Coil, to the Yellow-Black Wire, to the Switch, to the Black Lead Wire, to the Terminal Block. The Capacitor is wired across the Governor Points to reduce arcing. The Red Wire runs from the Rear Commutator Brush and connects with a Black Wire of the Capacitor at the Resistor. The other Black Wire of the Capacitor connects at the Resistor with the Black Wire from the Motor.

Note: The 5 Wire Motor, Series C and D, have longer Governor Brush holders and use longer Brushes. The holders are positioned diametrically opposite each other.

The C series motor is interchangeable in Gray Line machines having a micro switch by wiring per the diagram. The C series motor is not interchangeable in the Gray Line Contact Blade Type machines. A special CS series with the 3 Wires can be had on order designating that it is a CS motor desired with 3 wires.

For purpose of the Resistor see MOTOR CIRCUITRY - 3 WIRE TYPE.

MOTOR TROUBLES

MOTOR FAILS TO RUN:

First check the Cord and Wall outlet.
Check the Cord for breaks.
Check the Governor Brushes for sticking.
Check the Commutator Brushes for sticking.
Check the Contact Points, or the Micro Switch and the wiring.

MOTOR CONTINUES TO RUN AFTER OPERATION:

Check the Contact Points or the Micro Switch for sticking.
Check for a short in the Capacitor (3 wire type) by disconnecting the Black Wire from the Capacitor to the Contact Block.

MOTOR RUNS AT EXCESSIVE SPEED:

Check the Capacitor for being shorted by disconnecting at the resistor, the Black wire from the Capacitor to the Red Wire from the Motor.
Check the Governor Points for being pitted to an extent that they cannot open.
Check for a short between the Governor Rings.
(NOTE: If the Motor runs for any length of time at an excessive speed always check the Geneva points for damage and check the Geneva clearance to the Actuator.)

MOTOR RUNS BUT IS ERRATIC IN SPEED:

Check the Governor Brushes for sticking.
Check the Commutator Brushes for sticking.
Check the Governor Points.
Check the Capacitor if the Governor Points are arcing.

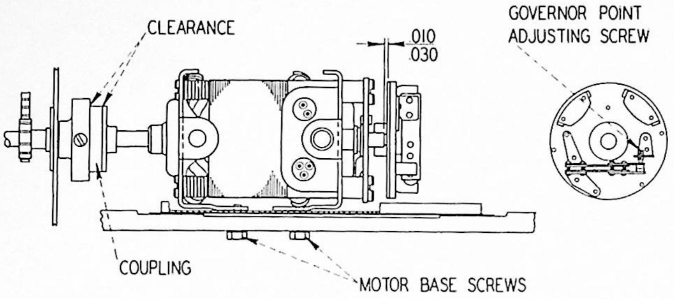
MOTOR RUNS SLOW - SMOKES - OVERHEATS:

Motor has a defective field Coil.
Check cord - either end hot.

MOTOR RUNS PART OF THE TIME:

The Motor has a "dead" spot where it will not start:
Check for sticking Brushes.
The Motor may have a defective field coil.

ADJUSTMENTS



ALL MODELS

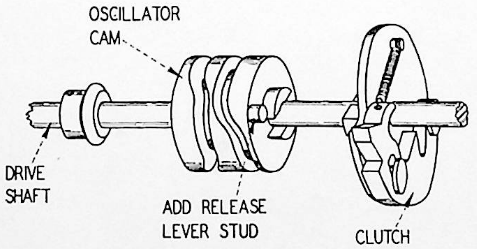
ADJ. 1 MOTOR ALIGNMENT AND GOVERNOR SETTING: Loosen the four Motor Base Screws. While running just the Motor, shift the Motor until the point of least vibration is obtained and at the same time retain clearance at the coupling so that it is free. Loosen the Allen Screws on the Governor and move it in or out to have .010 to .030 of the Governor Brush showing.

The machine speed for the various models of the Friden Calculators are:

Green case models (A-B-C-D-S).	450 RPM
Gray case models (C-D-S-ST)	495-500 RPM
Taupe case models (CW-DW-SW-STW-ACG-SRW) . . .	495-500 RPM

Test for freeness of the Armature Shaft by turning it manually. If it is tight then tap on the Motor End plates. The end play of the Armature Shaft is .000 - .003. Shims 4135 .005 thick and 4136 .010 thick can be used for controlling the end play.

Place a drop of oil on the Motor End Plate Bearings once every eight months.



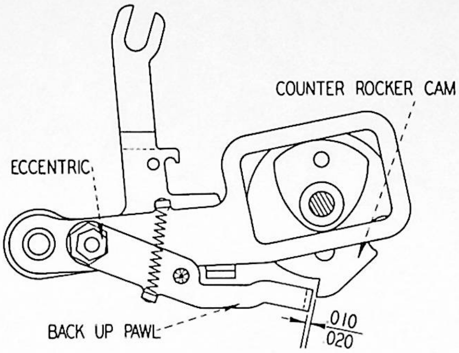
ALL MODELS

ADJ. 2 TIMING OF DRIVE SHAFT: Before installing the Clutch, position the Drive Shaft so the Add Release Lever Stud on the Oscillator Cam will be up and toward the front of the machine. In this position the Drive Shaft will be prevented from backing up by the Back Up Pawl and the Counter Rocker Cam, Adj. 3.

NOTE: If the Add Release Lever Stud is to the rear when the Clutch is installed, the Drive Shaft will be 180 degrees out of time.

Oil the bearing surface of the Clutch.

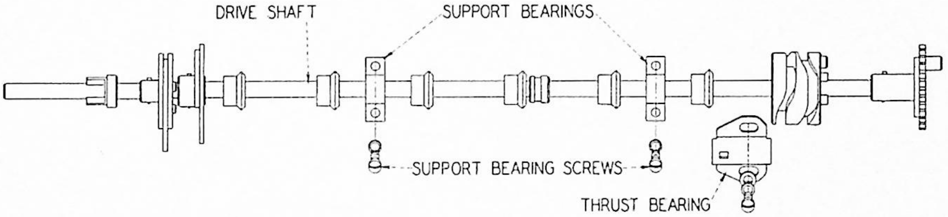
ADJUSTMENTS



ALL MODELS

ADJ. 3 BACK UP PAWL: When the Drive Shaft is in Home Position, there is to be .010 to .020 clearance between the Counter Rocker Cam and the Back Up Pawl. Adjust at the Eccentric, keeping high side down. If there is a ratcheting sound at the completion of a cycle, caused by the Clutch Dog contacting the Main Drive Gear Ratchet, the clearance is too wide.

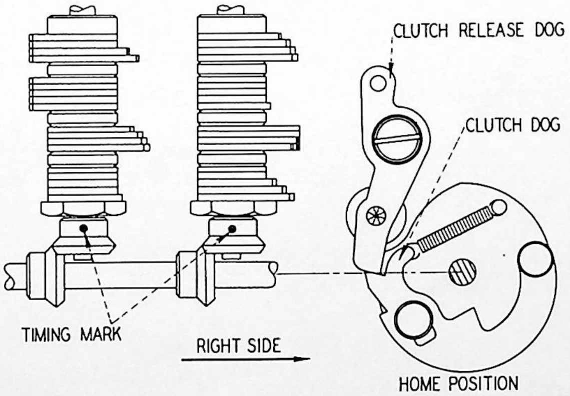
Oil all bearings.



ALL MODELS

ADJ. 4 DRIVE SHAFT - ADJUSTMENT FOR FREENESS: Rotate the Drive Shaft and tighten the Support Bearing Screws one at a time. If the Drive Shaft binds as a screw is tightened, loosen the screw and try another until all Support Bearings are tight and the Drive Shaft cycles freely by hand crank. The Thrust Bearing is tightened after the Actuators are adjusted. Never leave a screw loose to free a Drive Shaft. In some cases it may be necessary to shim between the Front Bearing Plate and the Support Bearings to free the Drive Shaft.

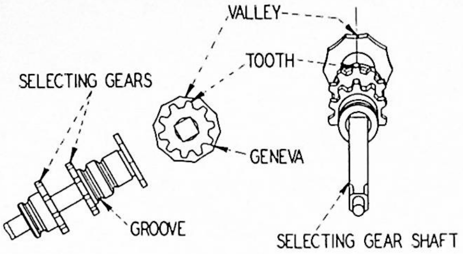
Oil all bearings.



ALL MODELS

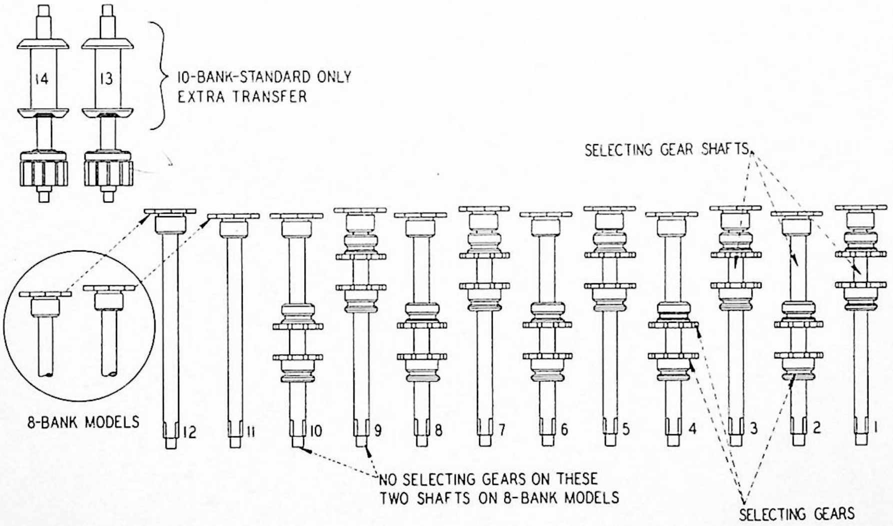
ADJ. 5 ACTUATOR TIMING: With the Clutch Dog rotated tight against the Clutch Release Dog, which positions the Drive Shaft in Home Position, install the Actuators with the Timing Mark straight up. Before installing the Actuators, place a small amount of grease on the bearings and gears then install the Actuators beginning from the right side of the machine with the Number 1 Actuator. Whenever the Drive Shaft is in Home Position the Timing Marks on the Actuator Gears should be straight up.

ADJUSTMENTS



ALL MODELS

ADJ. 6 SELECTING GEAR TIMING: The Selecting Gears are matched Tooth to Tooth. The Gear having the groove next to its teeth is installed in the rear position on the Selecting Gear Shaft as shown. The Selecting Gears are installed on the Selecting Gear Shafts with a Tooth matched to a Valley of the Geneva. Install the gears on the shafts prior to installing the shafts. After installing the gears grasp each shaft between the thumb and forefinger and tip the shaft from end to end. The Gears should slide freely up and down the shaft. The Selecting Gear Shaft should have a light film of oil.



ADJ. 7 SELECTING GEAR SHAFTS - INSTALLATION:

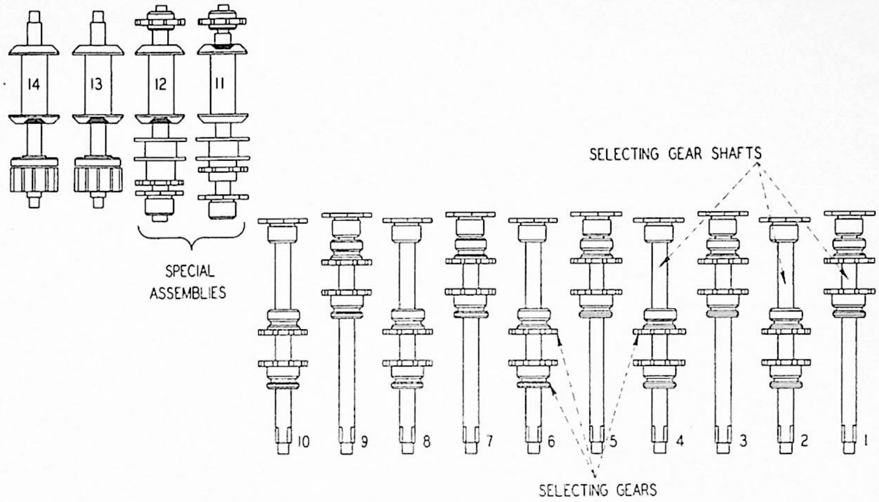
10 COLUMN GRAY LINE MODELS WITH EXTRA TRANSFER 13th AND 14th ORDERS: #1 Long, #2 Short; #3 Long, #4 Short; #5 Long, #6 Short; #7 Long, #8 Short; #9 Long, #10 Short; #11 Short; #12 Long.

8 COLUMN GRAY LINE MODELS (DO NOT HAVE EXTRA TRANSFER): #1 Long, #2 Short; #3 Long, #4 Short; #5 Long, #6 Short; #7 Long, #8 Short; #9 Long, #10 Short; #11 Long; #12 Short.

NOTE: The 10 Column Gray Line Models without extra transfer use this same alternate order of installation.

TO INSTALL THE SHAFTS: Since the Selecting Gears are installed on the shaft per Adj. 6, grasp the two gears between the thumb and forefinger and hold tight to keep the timing. Slip them off the shaft and position them in front of the Bearing Plate; insert the shaft through the plate, into the gears and into the Front Bearing Plate. Check the tooth to valley timing.

Oil the bearings.

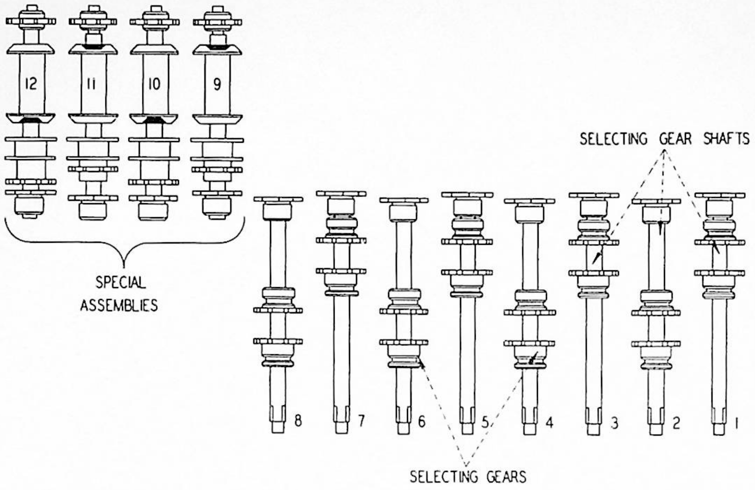


ADJ. 8. SELECTING GEAR SHAFT - INSTALLATION: 10 COLUMN 'W' LINE MODELS: #1 Long, #2 Short, #3 Long, #4 Short, #5 Long, #6 Short, #7 Long, #8 Short, #9 Long, #10 Short. The #11 and #12 orders do not have Shafts since Selecting Gears are not required in these positions; therefore, the Genevas are on the Add - Subtract Gear Shaft Assembly. These Assemblies are installed to give the Geneva the Short and Long arrangement.

TO INSTALL THE SHAFTS: Since the Selecting Gears are installed on the shaft per Adj. 6, grasp the two gears between the thumb and forefinger and hold tight to keep their timing. Slip them off the shaft and position them in front of the Bearing Plate; insert the shaft through the plate into the gears and into the Front Bearing Plate. Check the tooth to valley timing.

If the Selecting Arms are in place, the Selecting Gears may be held with tweezers while the Shaft is being installed.

Oil the Bearings.



ADJ. 9 SELECTING GEAR SHAFT - INSTALLATION: 8 COLUMN 'W' LINE MODEL: #1 Long, #2 Short, #3 Long, #4 Short, #5 Long, #6 Short, #7 Long, #8 Short, #9, #10, #11, #12 orders do not have Shafts since Selecting Gears are not required in these positions; therefore, the Genevas are on the Add - Subtract Gear Shaft Assembly. These Assemblies are installed to give the Genevas the Long, Short, Short, Long arrangement.

TO INSTALL THE SHAFTS: Since the Selecting Gears are installed on the shaft per Adj. 6, grasp the two gears between the thumb and forefinger and hold tight to keep their timing. Slip them off the shaft and position them in front of the Bearing Plate; insert the shaft through the plate into the gears and into the Front Bearing Plate. Check the tooth to valley timing.

If the Selecting Arms are in place, the Selecting Gears may be held with tweezers while the Shaft is being installed.

Oil the bearings.

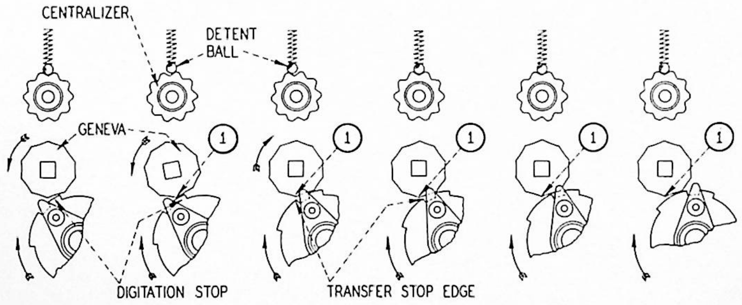


FIG. 1 FIG. 2 FIG. 3 FIG. 4 FIG. 5 FIG. 6

GENEVA ACTION - AFTER DIGITATION: To assist in understanding the Geneva Action after Digitation, the following explains the sketches. Since the Geneva is rotated by the action of Actuator Segments against the Selecting Gears (not shown), Fig. 1 shows the Geneva as it completes its revolution. The Digitation Stop has moved under the Geneva. As the Actuator continues its rotation, Point 1 will rock against the Digitation Stop, Fig. 2, because of momentum. The Digitation Stop prevents the Geneva from rotating further. The Detent Ball climbs on the centralizer. The Actuator continues its rotation, Fig. 3, and the Geneva is rocked back by the Detent Ball and Spring so Point 1 is up and clear of the Transfer Stop Edge. This allows the Edge to pass under the Geneva without contacting Point 1, Fig. 4. The Geneva is centralized and held as the actuator continues its rotation, Figs. 5 and 6. If the Geneva Clearance is too close or too wide, Point 1 can rock into the Edge of the Transfer Stop and cause the Geneva to be turned, thus giving an error. Such action would damage the Transfer Stop Edge.

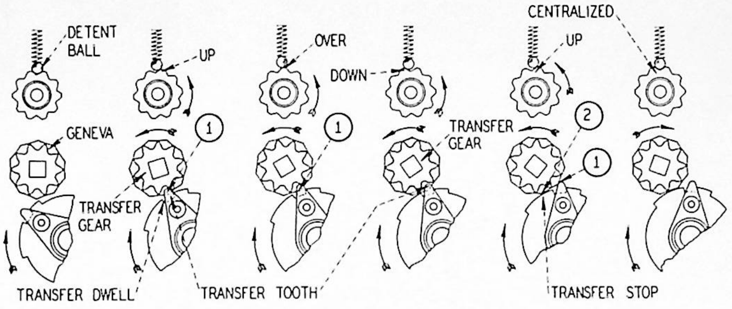
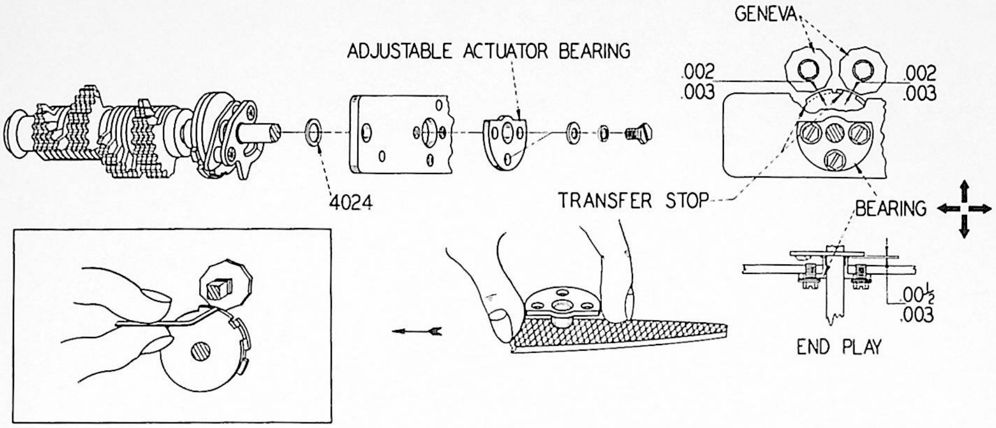


FIG 1 FIG 2 FIG 3 FIG 4 FIG 5 FIG 6

GENEVA ACTION - AFTER TRANSFER: To assist in understanding the Geneva Action after Transfer, the following explains the sketches. Fig. 1 shows the Geneva held steady (no Digitation) by the Detent Ball and spring as the Actuator starts to move under it. As the Actuator continues to rotate, the Transfer Tooth contacts the Transfer Gear teeth and turns the Geneva, Fig. 2, so Point 1 is turned in the Transfer Dwell. The Actuator continues to rotate, Fig. 3, and Point 1 is coming out of the Transfer Dwell. As the Transfer Tooth leaves the Transfer Gear teeth, Fig. 4, the Geneva, by momentum, rocks down so Point 2, Fig. 5, contacts the Transfer Stop. This stops the rotation of the Geneva and allows only one Transfer. The Geneva will centralize as the Actuator continues its rotation, Fig. 6.

ACTUATOR END PLAY AND GENEVA CLEARANCE: After the Bearing and Guide Plate is installed and all of its screws are tightened, the Actuator Bearings are adjusted. The adjustment of the Actuator Bearings accomplishes two things; it adjusts the Actuator End Play; it adjusts the Geneva Clearance. There are several styles of Actuator Bearings which may be found in the various models of the Calculator. The following sketches and explanations give the different methods of adjustment for the various style Bearings.



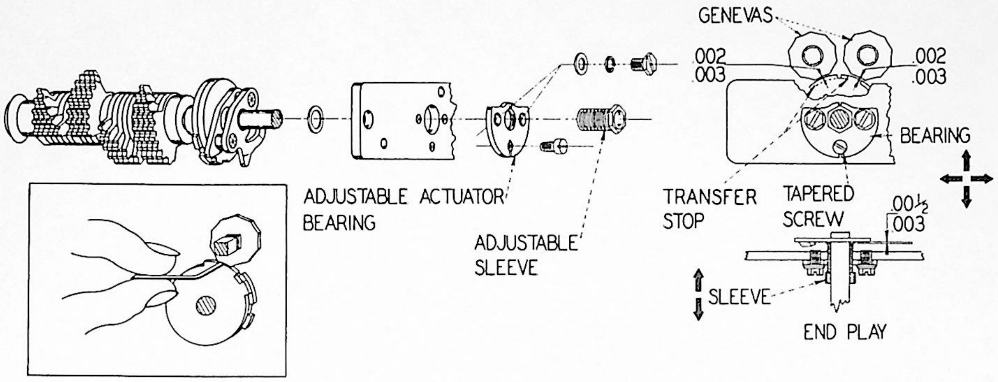
ST - S - C - D

ADJ. 10 ACTUATOR BEARING, ADJUSTABLE. ONE-PIECE STYLE (OBSOLETE): With the Drive Shaft Thrust Bearing loose and the Drive Shaft positioned to the left, install and position the Actuator Bearing to allow a slight clearance between the Geneva and the Transfer Stop of the Actuator, then tighten the upper right and left screws. Check the Actuator for End Play by using a push-pull test and for tightness by using a rotary motion test by lightly rocking the Actuator. The Actuator should have .001/2 to .003 end play. If the end play is greater than .003 remove the Bearing and install Shim 4024 on the Actuator Shaft. If the Actuator is tight and does not rock freely, then remove the Bearing and file off the inside end, being very careful to cut it down evenly and a little bit at a time by drawing the Bearing across a file in one direction until the desired end play is obtained.

After the Actuator End Play is obtained the Bearing is raised or lowered to obtain .002 to .003 clearance between the Geneva and the Transfer Stop of the Actuator at the point shown by the clearance arrows. The desirable clearance is .002 to .003. The clearance may be gauged by using a narrow strip of .003 shim stock, see inset. If the shim slips between the Geneva and the Transfer Stop, the clearance is too wide. It is also wise to test the clearance by touch thus educating the eyes and hands to the feel of the proper rocking motion of the Geneva.

After the End Play and the Geneva Clearance Adjustments have been made, the Drive Shaft Thrust Bearing is adjusted. See Adj. 14.

Oil the bearing.



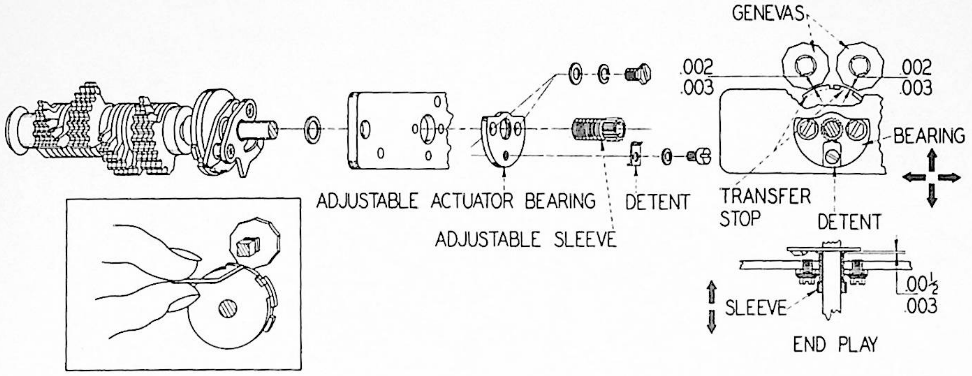
ST - S - C - D - STW

ADJ. 11 ACTUATOR BEARING, ADJUSTABLE. TWO-PIECE SCREW TYPE (OBSOLETE): With the Drive Shaft Thrust Bearing loose and the Drive Shaft positioned to the left, install and position the Adjustable Actuator Bearing to allow a slight clearance between the Geneva and the Transfer Stop of the Actuator and then tighten the upper right and left screws. Turn the Adjustable Sleeve IN or OUT to obtain .001/2 to .003 end play of the Actuator. Test the Actuator with a push-pull test. After the Sleeve is adjusted, loosen only the left upper screw and then tighten the Tapered Screw. This spreads the Bearing and clamps the Adjustable Sleeve.

After the Tapered Screw is tightened for retaining the Adjustable Sleeve setting, the Bearing is raised or lowered to obtain a .002 to .003 clearance between the Geneva and the Transfer Stop of the Actuator at the point shown by the clearance arrows. The desirable clearance is .002 to .003. The clearance may be gauged by using a narrow strip of .003 shim stock, see inset. If the shim slips between the Geneva and the Transfer Stop the clearance is too wide. It is also advisable to test the clearance by touch thus educating the eyes and hands to the feel of the proper rocking motion of the Geneva.

After the End Play and the Geneva Clearance adjustments have been made, the Drive Shaft Thrust Bearing is to be adjusted. See Adj. 14.
(NOTE: The replacement of this style Adjustable Actuator Bearing may be desirable by using the style shown in Adj. 10.)

Oil the bearing.



STW - SW - CW - DW

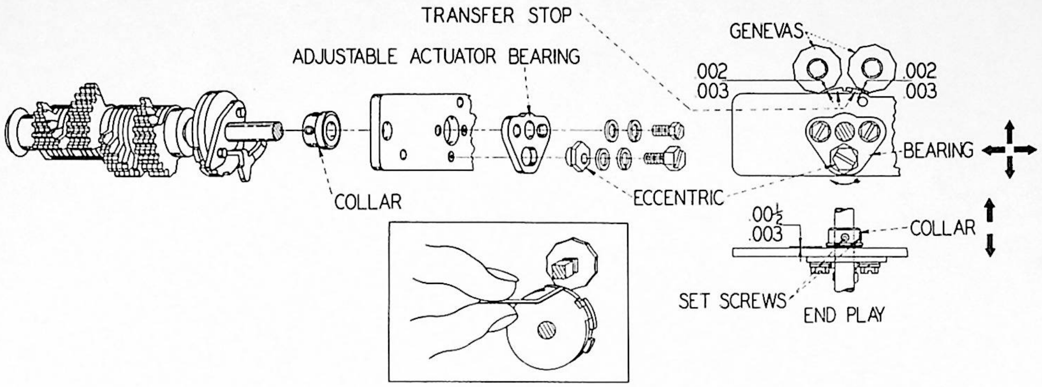
ADJ. 12 ACTUATOR BEARING, ADJUSTABLE. TWO-PIECE SCREW TYPE WITH DETENT.

(OBSOLETE): With the Drive Shaft Thrust Bearing loose and the Drive Shaft positioned to the left, install and position the Adjustable Actuator Bearing to allow a slight clearance between the Geneva and the Transfer Stop of the Actuator and then tighten the upper right and left screws. Turn the Adjustable Sleeve IN or OUT to obtain a .001/2 to .003 End Play of the Actuator. Test the Actuator with a push-pull test. After the Sleeve is adjusted, install the Detent and tighten its screw.

After the Detent is secured for retaining the Adjustable Sleeve setting, the Adjustable Bearing is raised or lowered to obtain .002 to .003 clearance between the Geneva and the Transfer Stop of the Actuator at the point shown by the clearance arrows. The desirable clearance is .002 to .003. The clearance may be gauged by using a narrow strip of .003 shim stock, see inset. If the shim slips between the Geneva and the Transfer Stop, the clearance is too wide. It is also advisable to test the clearance by touch thus educating the eyes and hands to the feel of the proper rocking motion of the Geneva.

After the End Play and the Geneva Clearance adjustments have been made, the Drive Shaft Thrust Bearing is to be adjusted. See Adj. 14.
(NOTE: The replacement of this style Adjustable Bearing may be desirable by using the style shown in Adj. 10.)

Oil the bearing.



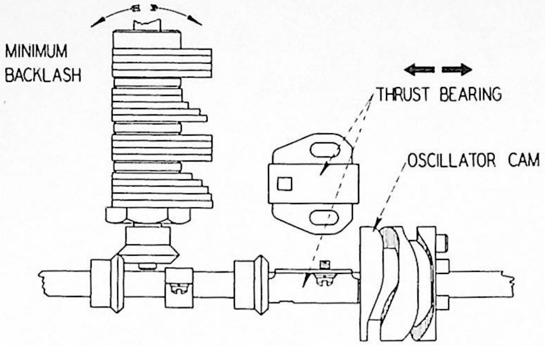
STW - ACG - SW - CW - DW - SRW

ADJ. 13 ACTUATOR BEARING, ADJUSTABLE. ONE-PIECE STYLE WITH ECCENTRIC LOCK: With the Drive Shaft Thrust Bearing loose and the Drive Shaft positioned to the left, install and position the Adjustable Bearing to obtain a .002 to .003 Geneva Clearance at the point shown by the clearance arrows between the Geneva and the Transfer Stop. Tighten the upper right and left screws. The desirable clearance is .002 to .003. The clearance may be gauged by using a narrow strip of .003 shim stock, see inset. If the shim slips between the Geneva and the Transfer Stop, the clearance is too wide. It is also advisable to test the clearance by touch, thus educating the eyes and hands to the feel of the proper rocking motion of the Geneva. After the Geneva Clearance is set and the screws tightened, turn the Eccentric to the right so the high point is contacting the upper edge of the slot in the Adjustable Bearing. This keeps the Adjustable Bearing from moving down. Next, adjust the Collar for .001/2 to .003 End Play of the Actuators and tighten both Set Screws. Test for excessive End Play by using a push-pull test on the Actuator.

After the Geneva Clearance and the End Play adjustments have been made, the Drive Shaft Thrust Bearing is then adjusted. See Adj. 14.

NOTE: The Eccentric is not a means of adjustment.

Oil all bearings.

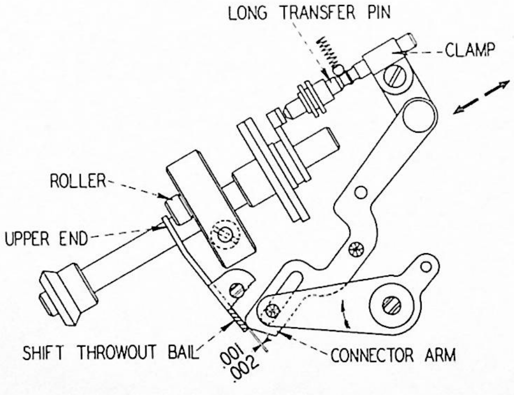


ALL MODELS

ADJ. 14 ACTUATOR BACK LASH: After the Actuator End Play adjustment has been made, the Drive Shaft is moved to the right to reduce the back lash of the Actuators to a minimum. Move the Drive Shaft as far to the right as possible; move the Thrust Bearing to the right and against the Oscillator Cam. Lightly secure the screws. Manually rotate the Drive Shaft and feel for a drag or a rough action of the Drive Shaft; if this action exists, test each Actuator to find those that have the least back lash. These will be the tight ones causing the drag or rough action. The others may be free, therefore, the free ones can not be tightened because the Drive Shaft is limited against the tight Actuators. This drag or rough action is to be removed, so lightly tap the Drive Shaft to the left until the Shaft rotation is free. Tighten the Thrust Bearing Screws. A screwdriver inserted in the Actuator Segments will serve as a means for testing the back lash.

Reason for Adjustment: Excessive Actuator back lash could result in errors for the Accumulator Dials or the Counter Dials, and also give Carriage Shift failures.

Oil the bearings.



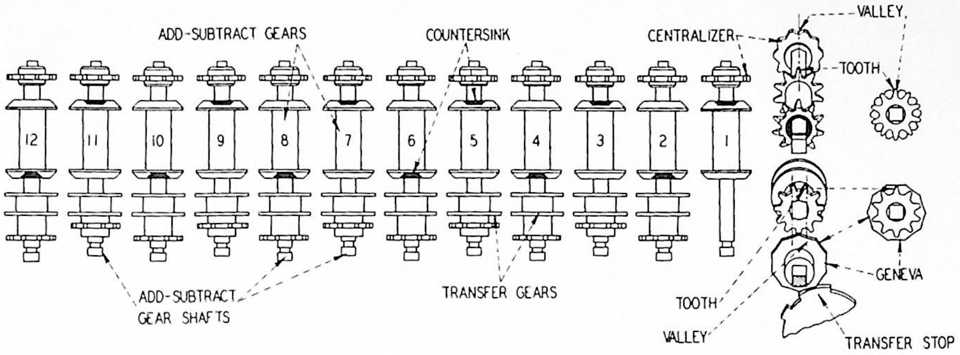
ALL MODELS

ADJ. 15 CONNECTOR ARM-DIVISION THROWOUT: This is one of the Division Sequence adjustments and is given at this point for convenience in adjusting when assemblying the machine. It is shown again in the Division Adjustments. The Connector Arm is attached to the Long Transfer Pin which is in the extreme left position of the Transfer Pin Bar on 10 Column models and in the next to the last position on 8 Column models.

With the Long Transfer Pin detented to the rear, adjust the Clamp so there will be .001 to .002 clearance between the Connector Arm and the Division Shift Throwout Bail when the Connector Arm is swung manually into position over the Bail.

Reason for Adjustment: To swing the Upper End of the Division Shift Throwout Bail into position for contact with the Roller on the #6 Actuator when the overdraft occurs in Division. Too wide a clearance may cause a delay in actuating the Bail, therefore, the Upper End will not position in front of the Roller which will result in a failure of actuating the Division Control Gear.

Oil all bearings.



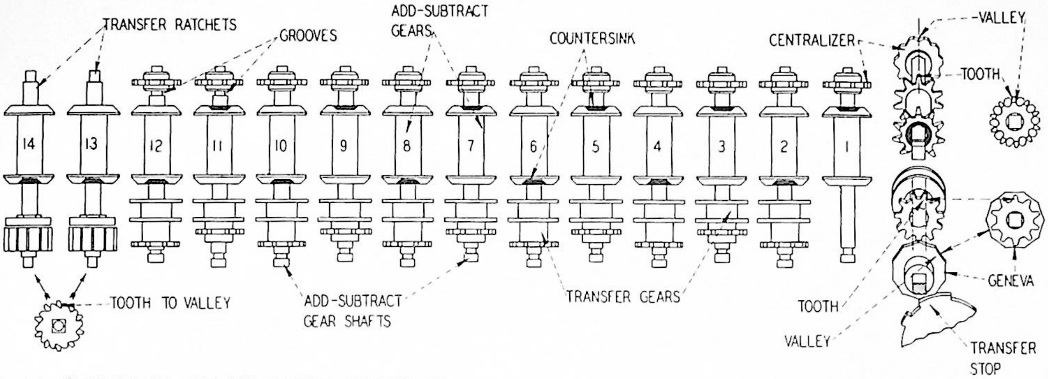
ADJ. 16 TRANSFER GEAR, ADD - SUBTRACT SHAFT AND GEAR TIMING: 8 COLUMN GRAY LINE AND 10 COLUMN GRAY LINE WITHOUT EXTRA TRANSFER: Each model has twelve Add - Subtract Gear Shafts. Assembled to each Shaft is an Add - Subtract Gear and a Transfer Gear with the exception of the number one Shaft which does not have a Transfer Gear.

The Add - Subtract Gear Shafts are of two lengths: a long; a short. The Add - Subtract Gears are identical and have one end countersunk which is used for identification in timing. The Add - Subtract Gears are timed with a gear tooth to a valley of the Add - Subtract Gear Centralizer. The Transfer Gears are of two lengths: a long; a short, and are timed with a gear tooth to a valley of the Geneva.

The timing and installation of these parts is according to the following chart and the above sketch. For proper installation, rotate the Actuators until the Transfer Stop is under the Geneva then install the Add - Subtract Gear Shafts to position an Add - Subtract Gear Tooth and a valley of the Add - Subtract Gear Shaft Centralizer straight up, and a Transfer Gear tooth timed to a valley of the Geneva.

ORDER	SHAFT LENGTH	ADD - SUBTRACT GEAR		TRANSFER GEAR		ADD - SUBTRACT GEAR TOOTH AND SHAFT CENTRALIZER VALLEY
		COUNTER SINK	TOOTH TO VALLEY OF	LENGTH	TOOTH TO VALLEY OF	
1st	Short	Up	Centralizer	None	------	Straight up
2nd	Long	Down	"	Long	Geneva	"
3rd	Short	Up	"	Short	"	"
4th	Long	Down	"	Long	"	"
5th	Short	Up	"	Short	"	"
6th	Long	Down	"	Long	"	"
7th	Short	Up	"	Short	"	"
8th	Long	Down	"	Long	"	"
9th	Short	Up	"	Short	"	"
10th	Long	Down	"	Long	"	"
11th	Short	Up	"	Short	"	"
12th	Long	Down	"	Long	"	"

Oil the Shafts lightly.



ADJ. 17 10 COLUMN GRAY LINE WITH EXTRA TRANSFER: This model has twelve Add - Subtract Gear Shafts and two Transfer Ratchet Shafts. Assembled to each of the fourteen Shafts is one Add - Subtract Gear. Eleven of the Add - Subtract Gear Shafts have a Transfer Gear. A Transfer Gear is not assembled on the first Add - Subtract Gear Shaft or on the two Transfer Ratchet Shafts.

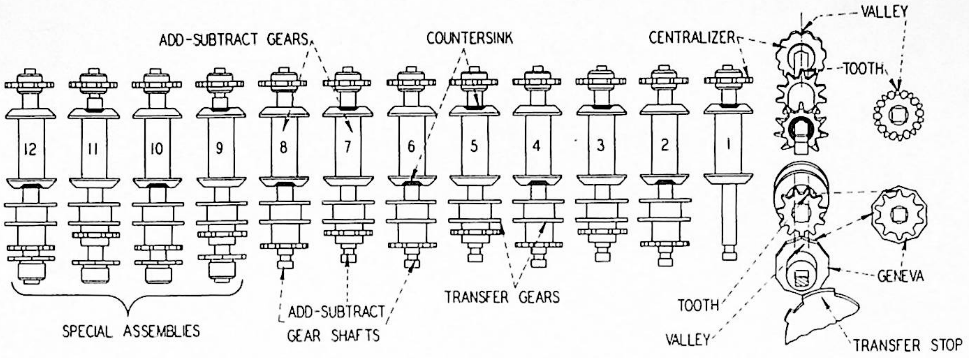
The Add - Subtract Gear Shafts are of two lengths: a long; a short. The Transfer Ratchet Shafts are equal in length. The Add - Subtract Gears are identical and have one end countersunk which is used for identification in timing. The Add - Subtract Gears are timed with a gear tooth to a valley of the Add - Subtract Gear Shaft Centralizer and to the valley of the Transfer Ratchet Shaft Gear. The Transfer Gears are of two lengths: a long; a short, and are timed with a gear tooth to a valley of the Geneva.

The 11th and 12th order Add - Subtract Gear Shafts are special and are identified by a groove located next to the Centralizer. These Shafts must be used in these orders since the Long Shaft is timed as a standard Short Shaft and the Short Shaft is timed as a standard Long Shaft.

The timing and installation of these parts is according to the following chart and the above sketch. For proper installation, rotate the Actuators until the Transfer Stop is under the Geneva and then install the Add - Subtract Gear Shafts for positioning an Add - Subtract Gear tooth and a valley of the Add - Subtract Gear Shaft Centralizer straight up, and a Transfer Gear tooth timed to a valley of the Geneva.

ORDER	SHAFT LENGTH	ADD - SUBTRACT GEAR		TRANSFER GEAR		ADD - SUBTRACT GEAR TOOTH AND SHAFT CENTRALIZER VALLEY
		COUNTER SINK	TOOTH TO VALLEY OF	LENGTH	TOOTH TO VALLEY OF	
1st	Short	Up	Centralizer	None	------	Straight up
2nd	Long	Down	"	Long	Geneva	"
3rd	Short	Up	"	Short	"	"
4th	Long	Down	"	Long	"	"
5th	Short	Up	"	Short	"	"
6th	Long	Down	"	Long	"	"
7th	Short	Up	"	Short	"	"
8th	Long	Down	"	Long	"	"
9th	Short	Up	"	Short	"	"
10th	Long	Down	"	Long	"	"
11th	Special long	Up	"	Short	"	"
12th	Special short	Down	"	Long	"	"
13th	Special Ratchet	Down	Ratchet	None	------	"
14th	Special Ratchet	Down	Ratchet	None	------	"

Oil the Shafts lightly.



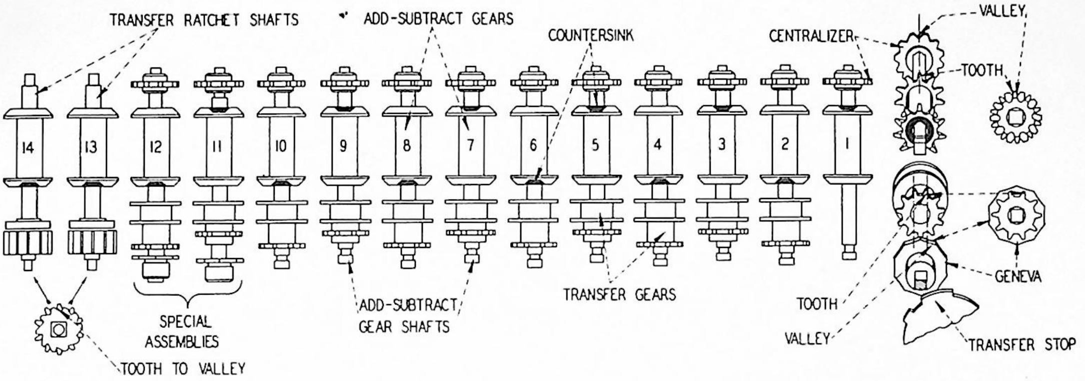
ADJ. 18 8 COLUMN 'W' LINE: This model has twelve Add - Subtract Gear Shafts. Assembled to each Shaft is an Add - Subtract Gear and a Transfer Gear with the exception of the number one Shaft which does not have a Transfer Gear.

The Add - Subtract Gear Shafts from the 1st through the 8th order are of two lengths: a long; a short. The 9th, 10th, 11th, and 12th orders have special Add - Subtract Gear and Shaft Assemblies. Each assembly consists of a Shaft, an Add - Subtract Gear, a Transfer Gear, and a Geneva. The Geneva is pressed on the Add - Subtract Gear Shaft since there are no Selecting Gear Shafts in these orders. The Add - Subtract Gears are identical and have one end countersunk which is used for identification in timing. The Add - Subtract Gears are timed with a gear tooth to a valley of the Add - Subtract Gear Shaft Centralizer. The Transfer Gears are of two lengths: a long; a short, and are timed with a gear tooth to a valley of the Geneva.

The timing and installation of these parts is according to the following chart and the above sketch. For proper installation, rotate the Actuators until the Transfer Stop is under the Geneva then install the Add - Subtract Gear Shaft for positioning an Add - Subtract Gear tooth and a valley of the Add - Subtract Shaft Centralizer straight up, and a Transfer Tooth timed to a valley of the Geneva.

ORDER	ADD-SUB SHAFT LENGTH	ADD - SUBTRACT GEAR		TRANSFER GEAR		ADD - SUBTRACT GEAR TOOTH AND SHAFT CENTRALIZER VALLEY
		COUNTER SINK	TOOTH TO VALLEY OF	LENGTH	TOOTH TO VALLEY OF	
1st	Short	Up	Centralizer	None	------	Straight up
2nd	Long	Down	''	Long	Geneva	''
3rd	Short	Up	''	Short	''	''
4th	Long	Down	''	Long	''	''
5th	Short	Up	''	Short	''	''
6th	Long	Down	''	Long	''	''
7th	Short	Up	''	Short	''	''
8th	Long	Down	''	Long	''	''
9th	Special Assembly	Up	''	Short	''	'' Geneva pressed on to give the Long Geneva order.
10th	Special Assembly	Down	''	Long	''	'' Geneva pressed on to give the Short Geneva order.
11th	Special Assembly	Up	''	Short	''	'' Geneva pressed on to give the Short Geneva order.
12th	Special Assembly	Down	''	Long	''	'' Geneva pressed on to give the Long Geneva order.

Oil the Shafts lightly.



ADJ. 19 10 COLUMN 'W' LINE: This model has twelve Add - Subtract Gear Shafts and two Transfer Ratchet Shafts. Assembled on each of the fourteen Shafts is one Add - Subtract Gear. Eleven of the Add - Subtract Gear Shafts have a Transfer Gear. A Transfer Gear is not assembled on the first Add - Subtract Gear Shaft or on the two Transfer Ratchet Shafts. The 11th and 12th orders have a special Add - Subtract Gear and Shaft Assembly. Each assembly consists of a Shaft, an Add - Subtract Gear, a Transfer Gear, and a Geneva. The Geneva is pressed on the Add - Subtract Gear Shaft since there are no Selecting Gear Shafts in these orders.

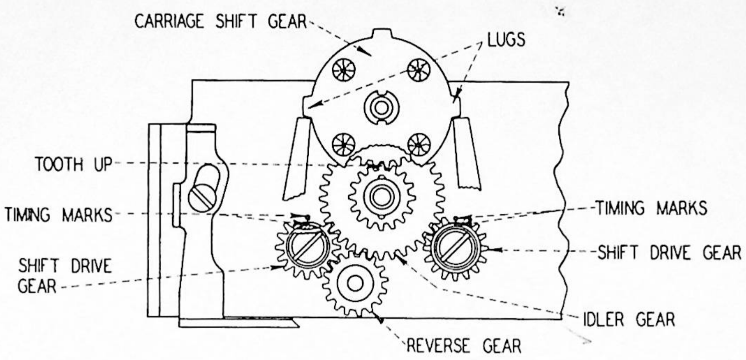
The Add - Subtract Gear Shafts from the 1st through the 10th order are of two lengths: a long; a short. The 11th and 12th orders have the special assemblies. The Transfer Ratchet Shafts are equal in length. The Add - Subtract Gears are identical and have one end counter sunk which is used for indentification in timing. The Add - Subtract Gears are timed with a gear tooth to a valley of the Add - Subtract Gear Shaft Centralizer or to the valley of the Transfer Ratchet Shaft Gear. The Transfer Gears are of two lengths: a long; a short, and are timed with a gear tooth to a valley of the Geneva.

The timing and installation of these parts is according to the following chart and the above sketch. For proper installation, rotate the Actuators until the Transfer Stop is under the Geneva then install the Add - Subtract Gear Shaft for positioning an Add - Subtract Gear tooth and a valley of the Add - Subtract Shaft Centralizer straight up, and a Transfer Gear tooth timed to a valley of the Geneva.

ORDER	ADD-SUB SHAFT LENGTH	ADD - SUBTRACT GEAR		TRANSFER GEAR		ADD - SUBTRACT GEAR TOOTH AND SHAFT CENTRALIZER VALLEY
		COUNTER SINK	TOOTH TO VALLEY OF	LENGTH	TOOTH TO VALLEY OF	
1st	Short	Up	Centralizer	None	------	Straight up
2nd	Long	Down	''	Long	Geneva	''
3rd	Short	Up	''	Short	''	''
4th	Long	Down	''	Long	''	''
5th	Short	Up	''	Short	''	''
6th	Long	Down	''	Long	''	''
7th	Short	Up	''	Short	''	''
8th	Long	Down	''	Long	''	''
9th	Short	Up	''	Short	''	''
10th	Long	Down	''	Long	''	''
11th	Special Assembly	Up	''	Short	''	'' Geneva pressed on to give the short Geneva order.
12th	Special Assembly	Down	''	Long	''	'' Geneva pressed on to give the long Geneva order.
13th	Special Ratchet	Down	Ratchet	None	------	''
14th	Special Ratchet	Down	Ratchet	None	------	''

Oil the Shafts lightly.

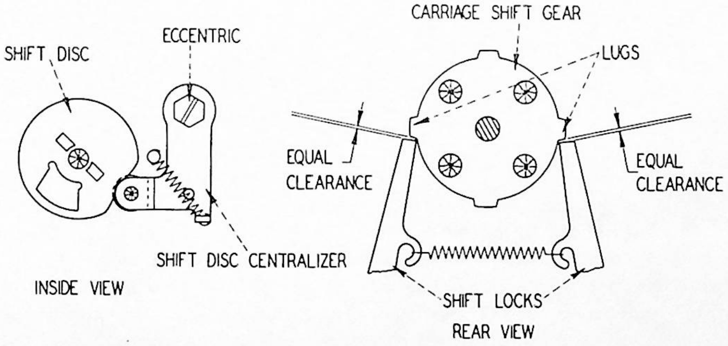
ADJUSTMENTS



STW - ACG - SW - CW - DW - SRW

ADJ. 20A SHIFT DRIVE GEARS TIMING - SMOOTH SHIFT: When the Timing Marks on the Shift Drive Gears and the Rear Bearing Plate are aligned and the Reverse Gear is in place, install the Shift Idler Gear with a tooth of its small gear up. Next install the Carriage Shift Gear with its Lugs parallel to the top of the Bearing Plate. NOTE: This timing applies also to the 4 Point Shift. The Carriage Shift Gear of both shifts is similar. Each has four shifting studs. The 4 Point Shift is an earlier style means of shifting the Carriage and is centralized by spring actuated centralizers. This gives a slightly rougher shifting action to the Carriage.

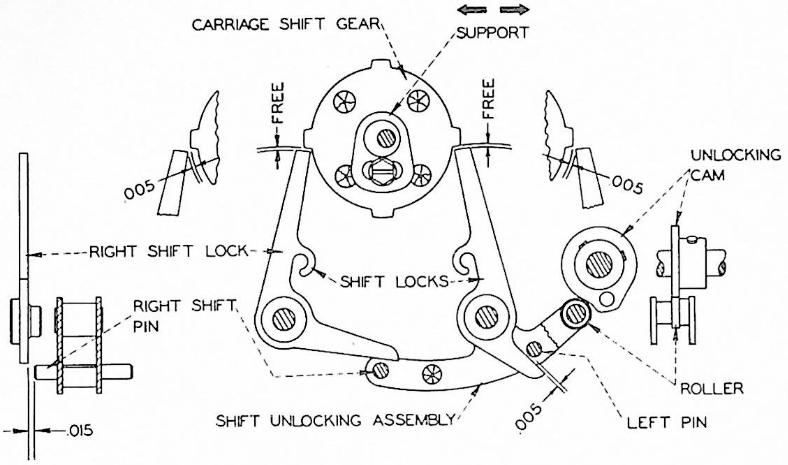
Oil all bearings.



STW - ACG - SW - CW - DW - SRW

ADJ. 20B SHIFT DISC CENTRALIZER: There is to be approximately equal clearance between the Shift Locks and Carriage Shift Gear Lugs. Adjust the Shift Disc Centralizer Eccentric to position the Shift Disc for holding the Carriage Shift Gear. Rotate the Shift Gear and check the clearance under each lug.

Oil all bearings.



STW - ACG - SW - CW - DW - SRW

ADJ. 20C ADJUSTABLE SUPPORT AND SHIFT UNLOCKING CAM - CARRIAGE SHIFT GEAR: SMOOTH SHIFT: Step 1. Move the Support to raise or lower the Carriage Shift Gear so the Shift Locks are free to move in and out under the Lugs with minimum clearance. Test in all positions. Step 2. Adjust the Unlocking Cam by advancing or retarding so the Shift Locks will clear the Lugs with approximately .005 clearance before the Shift Gear turns. Test all four lugs in right and left shift cycles. Step 3. The Roller on the Shift Unlocking Assembly has a large and small diameter. Use the larger roller diameter unless the Shift Unlocking Assembly bottoms at its limit of travel or if there is insufficient clearance for the Left Pin to pass the tail of Left Shift Lock when the Left Shift Key is depressed. There should be approximately .005 minimum clearance. Step 4. To insure a right shift in multiplication, carefully form the Right Shift Lock for .015 clearance to end of the Right Shift Pin.

Oil all bearings.

ADJUSTMENTS

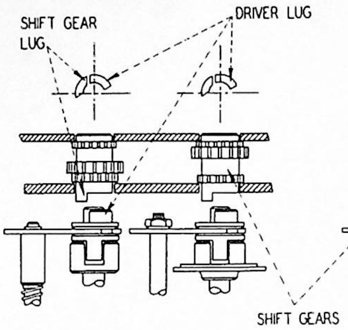


FIG. 1

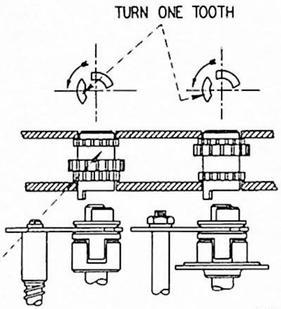


FIG. 2

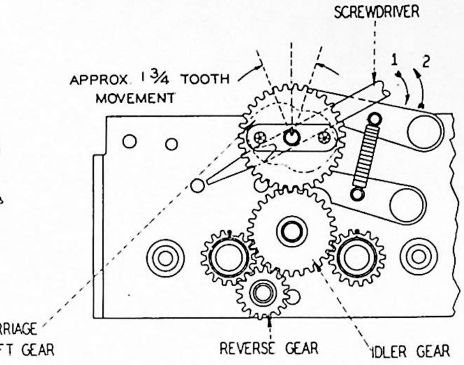


FIG. 3

STW - ST - S

ADJ. 21 SHIFT DRIVE GEARS TIMING - TWO POINT: Fig. 3. With the Drive Shaft in Home Position install the Reverse Gear, the Idler Gear, and the Carriage Shift Gear (no timing for these gears). Looking down from the top of the machine between the Add - Subtract Gate and Rear Bearing Plate, insert the Shift Gears, Fig. 1, so that the Shift Gear Lug of each has minimum clearance to the Driver Lug. Then disengage the Shift Gears from the Idler Gear and the Reverse Gear enough to turn them one tooth in the direction of rotation shown by arrows, Fig. 2. Reposition into mesh, install the Shift Gear Bearing Plate, depress the Right Shift Key and insert a screwdriver, Fig. 3, into the Carriage Shift Gear and force the gear in the direction of Arrow #1. This will bring the two Lugs together. The Carriage Shift Gear should rotate approximately 1 and 3/4 teeth, or more than one tooth but not more than two teeth. Repeat this procedure using the Left Shift Key and moving the screwdriver in the direction of Arrow #2.

This timing is the same for all models having the two point Carriage Shift Gear with the exception of the early model S, series #100,000 to 104,999 in which the right Shift Drive Gear is positioned two full teeth in the direction of rotation.

Oil all bearings.

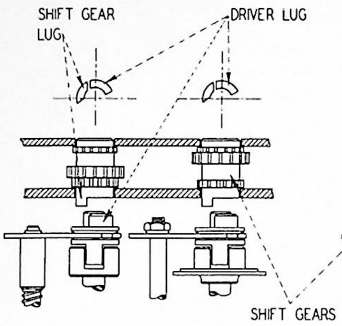


FIG. 1

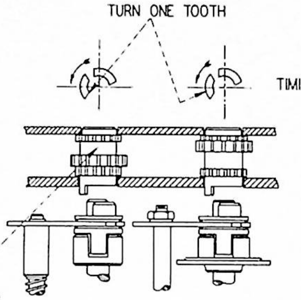


FIG. 2

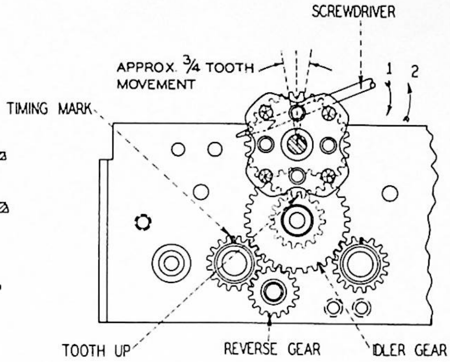


FIG. 3

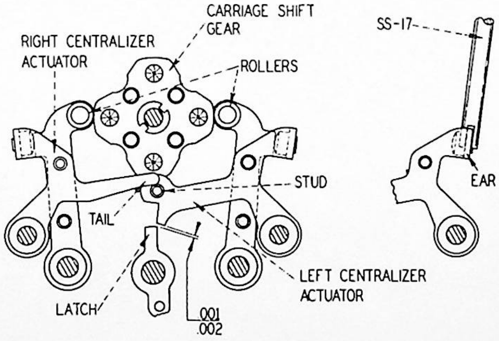
STW - C - D

ADJ. 22 A SHIFT GEAR TIMING - FOUR POINT: Fig. 3. Install the Reverse Gear (no timing) and the Idler Gear with a tooth of its small gear straight up to receive a Valley of the Carriage Shift Gear. Install the Carriage Shift Gear with two centralizing detents parallel with the top of the Rear Bearing Plate. To hold the Carriage Shift Gear in place, install the Shift Gear Bearing Plate upside down. Looking down from the top of the machine between the Add - Subtract Gate and Rear Bearing Plate, insert the Shift Gears, Fig. 1, so that the Shift Gear Lug of each has minimum clearance to the Driver Lug. Then disengage the Shift Gears from the Idler Gear and the Reverse Gear enough to turn them one tooth in the direction of rotation shown by the arrows, Fig. 2. Reposition into mesh, install the lower bearing plate, centralizers, scissors, etc., and carefully swing the upper bearing plate into place and secure it.

Depress the Right Shift Key and insert a screwdriver, Fig. 3, into the Carriage Shift Gear and force the gear in the direction of Arrow #1. This brings the two Lugs together. The Carriage Shift Gear should rotate approximately 3/4 of a tooth or not more than one tooth. Repeat this procedure using the Left Shift Key and by moving the screwdriver in the direction of Arrow #2.

For the machines having timing marks on the Shift Gears and Rear Bearing Plate, just line up the timing marks after positioning the Idler Gear and the Carriage Shift Gear.

Oil all bearings.

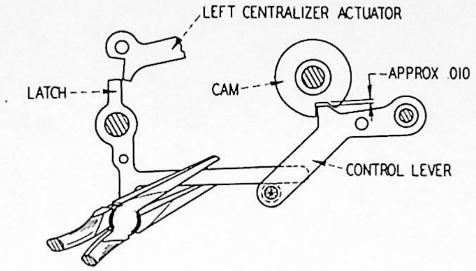


STW - C - D

ADJ. 22B SHIFT GEAR CENTRALIZERS: Rotate the Carriage Shift Gear until the Rollers on the Centralizer Arms are in the position illustrated. The Left Centralizer Actuator is to have approximately .001 - .002 clearance to the Latch. Form the ear of the Left Centralizer Actuator to obtain this clearance, and form the ear of the Right Centralizer Actuator so its tail is not raised by the Stud of the Left Actuator. Also form its ear.

Oil all bearings.

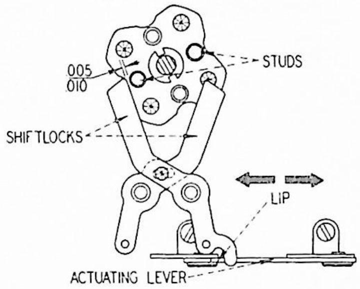
ADJUSTMENTS



STW - C - D

ADJ. 22C SHIFT CENTRALIZER CONTROL LEVER: On a retarded release of the Shift Keys, the Control Lever is to be approximately .010 from bottoming in the Cam when the Latch releases the Left Centralizer Actuator. Form the Tail of the Latch.

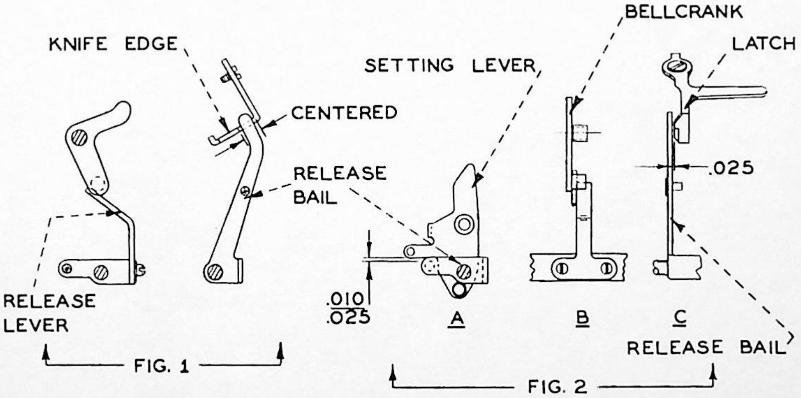
Grease the notch.



STW - C - D

ADJ. 22D SHIFT LOCKS: The Shift Locks should clear the Studs on the Carriage Shift Gear by .005 to .010 in both shifts. Adjust by forming the Lip on the Actuating Lever.

Oil all bearings.

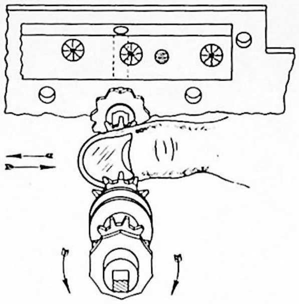


STW - C

ADJ. 22E LATCH RELEASE BAILS: Step 1, Fig. 1. With the Shift Gear half turned, the upper end of the Release Bail is to be centered between the knife edge of the Latch and the rear of the latch. Form the Release Lever. Step 2, Fig. 2. With the machine in Home Position, the Release Bail is to clear the knife edge of the Latch by .025, Fig. 2C. Push the Bail forward to check. Adjust by having the Release Lever against the Setting Lever, Fig. 2A, and moving the Release Bail for the clearance; then position the Release Lever against the Bellcrank, Fig. 2B, to remove the end play from the assembly, yet have it free. Step 3, Fig. 2A. The Stud on the Release Bail is to clear the Setting Lever approximately .010 - .025. Twist the Release Bail.

Oil all bearings.

ADJUSTMENTS



ALL MODELS

ADJ. 23 SPIN TEST: After installing the Rear Bearing Plate and tightening the end screws and rear center screw, give the Add - Subtract Gears a Spin Test. Do this in the manner illustrated above by placing the thumb or a finger on the Add - Subtract Gear and completely rotate each assembly to check for the freeness of the Add - Subtract Gear Shaft. Rotate the Drive Shaft while progressing from right to left.

After testing; install the Detent Balls and the Detent Springs with the small end against the Ball; install the spring retainer and then repeat the Spin Test to check for proper detent action.

Oil the bearings in the Rear Bearing Plate.

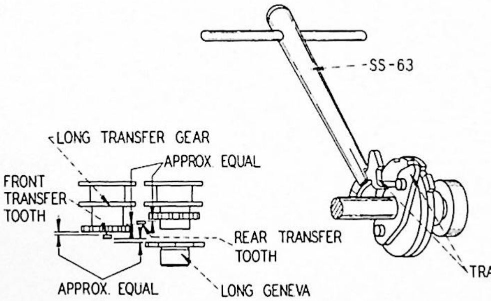


FIG 1

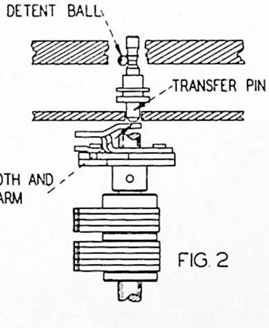


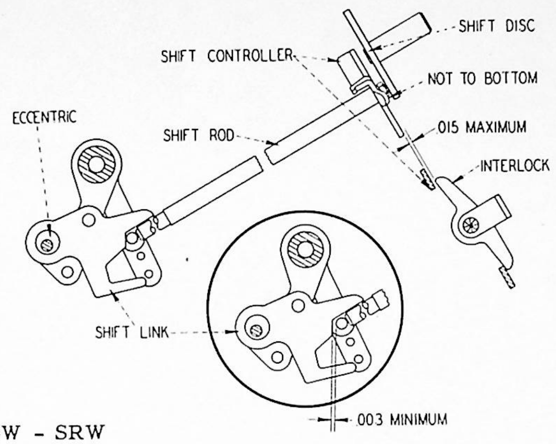
FIG. 2

ALL MODELS

ADJ. 24 TRANSFER TOOTH AND RESTORE ARM: Fig. 1. The Rear Transfer Tooth which passes between the two Transfer Gears is to clear them with approximately equal clearance. The Front Transfer tooth is to pass between the Long Geneva and the teeth of the Long Transfer Gear without touching either. Push the Geneva to the rear to take out the play; the Transfer Tooth should not contact it. The Transfer Restore Arm, Fig. 2, is to fully restore the Transfer Pin so the Detent Ball holds it restored. Form the Transfer Tooth and Restore Arm with SS-63.

Oil Transfer Pins.

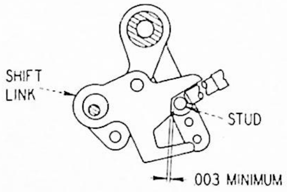
ADJUSTMENTS

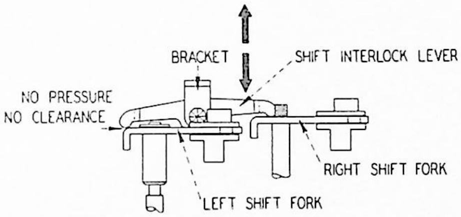


STW - ACG - SW - CW - DW - SRW

ADJ. 25A SHIFT ENGAGING LINK - RIGHT AND LEFT SHIFT: With the Carriage Shift Gear centralized, depress a Shift Key and hold down. Adjust the Eccentric so the Shift Rod has little or no play and that the Shift Controller does not bottom on the Shift Disc. Also a .015 maximum clearance can exist between the Shift Controller and the Interlock. Form the Interlock. Keep the Eccentric up. Adjust the other Shift Link in the same manner. Restore the Shift Key; manually raise and lower each Link to test that it will position in front of its stud, see inset. The clearance should be no less than .003.

Oil all bearings: Shift Rod, Shift Link, etc.



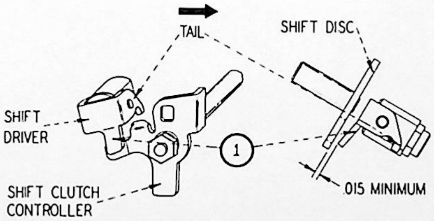


ST - C - D - S

ADJ. 25A-1 SHIFT ENGAGING LINK AND INTERLOCK LEVER: Step 1. Have the machine in Home Position, adjust the Shift Link Eccentric for a minimum of .003 clearance to the Stud. Check both Shift Links. Step 2. Depress and hold the Right Shift Key. The Shift Interlock Lever is to contact the Right and the Left Shift Forks without pressure or clearance. Form the Bracket in or out.

Reason for Adjustment: To insure that only one Shift will be engaged at a time, especially during Tabulation when the Carriage is in first position and the Left Shift is being disengaged and the Right engaged.

Oil the Shift Rods.



STW - ACG - SW - CW - DW - SRW

ADJ. 25B SHIFT DRIVER DISENGAGING: Looking from the rear with the machine in Home Position, manually raise the Shift Clutch Controller to engage the Shift Driver into the Shift Disc. Allow the Shift Clutch Controller to restore. Release the Clutch and rotate the machine by hand. Point 1 is to engage and clear the Shift Disc by a minimum of .015. Adjust by forming the tail of the Shift Driver outward. Test each Shift Driver.

Reason for Adjustment: To insure the Shift Driver will disengage after a shift cycle.

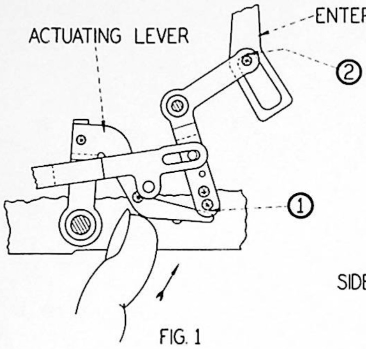


FIG. 1

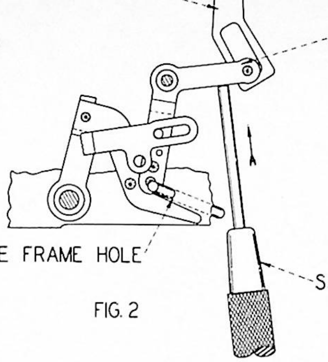


FIG. 2

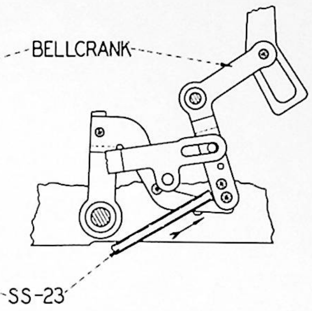


FIG. 3

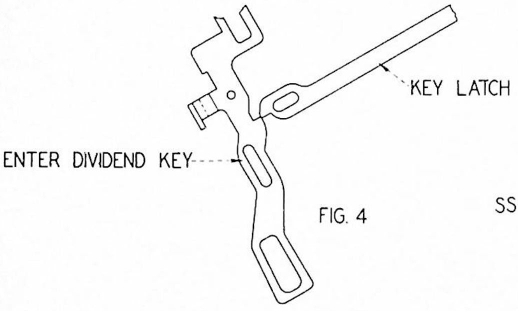


FIG. 4

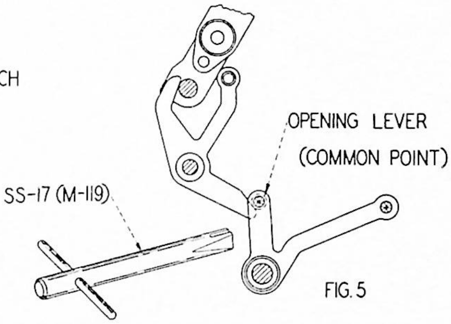


FIG. 5

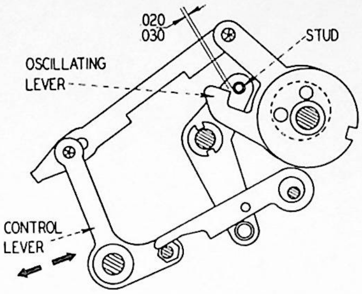
STW - ACG - SW - CW - DW - SRW

ADJ. 26A CLUTCH RELEASING - ENTER DIVIDEND: The Clutch Releasing is controlled at the Common Point Fig. 5, however, before making any adjustment, test for play between Points 1 and 2, Fig. 1. Hold the Actuating Lever upwards and press lightly on the Enter Dividend Key. Points 1 and 2 should touch lightly. TO REMOVE PLAY: Position the Bellcrank, Fig. 2, by manually pulling it down. Insert a suitable shaft in the Side Frame Hole and Tap upward with SS-23, Fig. 2. TO REMOVE PRESSURE: Tap on the Bellcrank with SS-23, Fig. 3. Do not form the Actuating Lever.

COMMON POINT ADJUSTMENT. Fig. 5. If the above is correct, adjust the Clutch Releasing to occur slightly before the Key Latch slips into place, Fig. 4. Adjust by twisting the Opening Lever with SS-17 (M-119). On some machines the Clutch Releasing and Key Latching can be at the same time without causing a rattle of the main Clutch. Whenever the Opening Lever is adjusted always check Adjustments 30 and 40F.

Oil all bearings.

5-15-57	Remove and Destroy Page 33	Insert This Page	Revision 1



STW - ACG - SW - CW - DW - SRW

ADJ. 26B POWER SHIFT - INITIAL POSITIONING OF OSCILLATING LEVER: Depress the Plus Key and rotate the Drive Shaft by hand crank until the Oscillating Lever is at its closest position to the Stud. Measure for .020 to .030 clearance. Adjust by forming the Control Lever. (By removing the Keyboard, the Control Lever can be reached.)

Reason for Adjustment: This positions the Oscillating Lever for proper engagement with the Stud when the Operating Keys are depressed and the Drive Shaft rotates.

Oil all bearings.

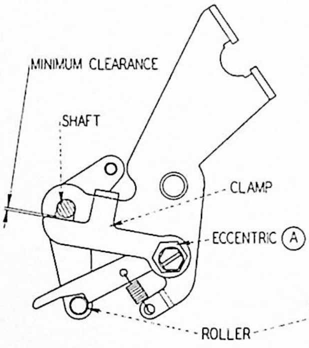


FIG. 1

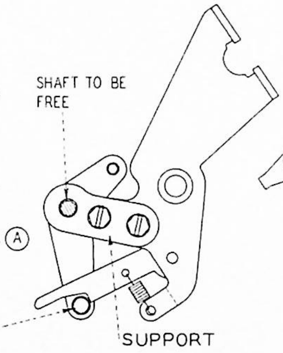


FIG. 2

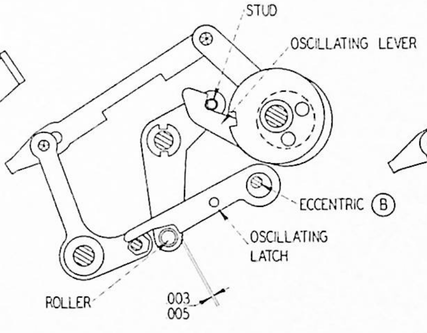


FIG 3

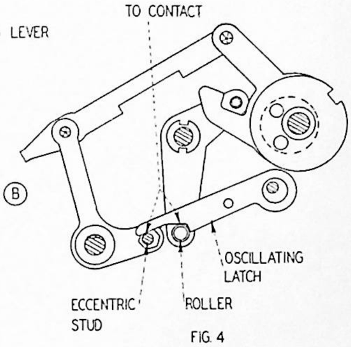


FIG 4

STW - ACG - SW - CW - DW - SRW

ADJ. 26C, REV. 2 - POWER SHIFT - ADJUSTMENT OF OSCILLATING LEVER: Fig. 1: Adjust the Clamp by Eccentric A for minimum clearance to Clear Levers Shaft or adjust the Support, Fig. 2, so the Shaft is free. Fig. 3: Test the overthrow of the Roller to the Oscillating Latch by depressing each Control Key (Enter Div'd, Carriage Clear, all Multiplier Keys) and rotating the Drive Shaft by Hand Crank until the Oscillating Lever is on the high point of the Stud. Adjust Eccentric B with the lobe down to give a .003-.005 overlatch of the Oscillating Latch to the Roller. This would be on the Operating Key which causes the least movement of the Roller. Fig. 4: Using the Enter Dividend Key when the Oscillating Lever is away from the Stud, the Oscillating Latch is to contact the Roller and the Eccentric Stud. Adjust the Eccentric Stud. (This adjustment is applicable on machines without the parts per Adj. 33. On machines with these parts a clearance of .000-.020 may be necessary to insure the delatching of the Oscillating Latch on a retarded release of the Enter Dividend Key.)

Reason for Adjustment: Fig. 1 and 2; to prevent movement of Shaft and Roller during Carriage Clear. Fig. 3 and 4; to insure the holding of the Roller thus keeping all parts in position that are actuated by the action of the Oscillating Lever.

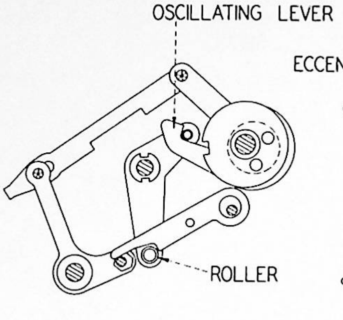


FIG. 1

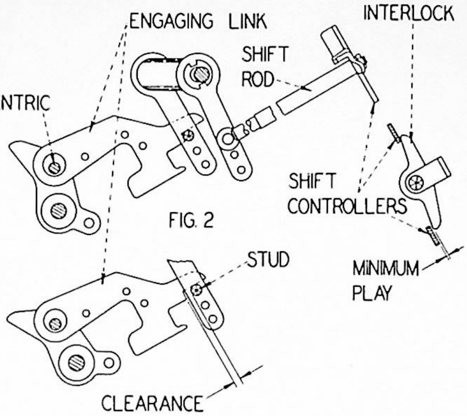


FIG. 2

FIG. 3

STW - ACG - SW - CW - DW - SRW

ADJ. 26D SHIFT ENGAGING LEVERS - LEFT SHIFT: Fig. 1. Depress the Enter-Dividend Key and rotate the Drive Shaft by hand until the Oscillating Lever has caused the Roller to reach its maximum throw. Fig. 2. Adjust the Engaging Link Eccentric with its high side up to position the Left Shift Rod to the rear so there is minimum play of the Interlock between the Shift Controllers. When the Enter-Dividend Key is restored, the Engaging Link is to restore with clearance to the Stud. Fig. 3.

Oil all bearings: Shift Rod, Engaging Link, etc.

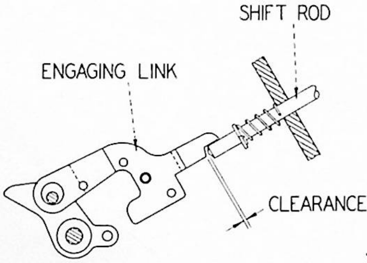


FIG. 1

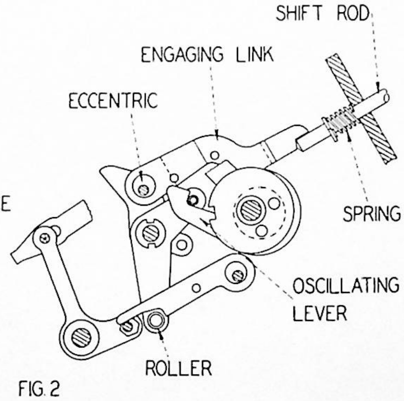


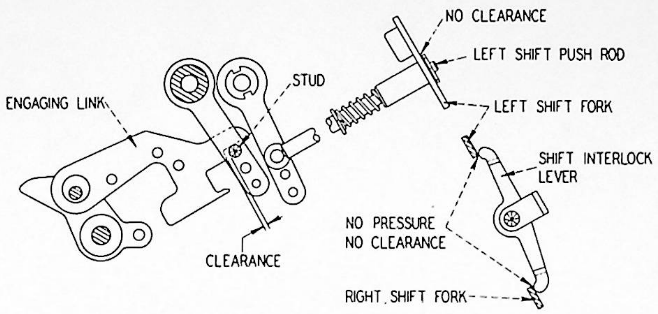
FIG. 2

STW - ACG - SW - CW - DW - SRW

ADJ. 26E SHIFT ENGAGING LEVER - CARRIAGE CLEAR: Fig. 2. Depress the Enter Dividend Key and rotate the Drive Shaft by hand until the Oscillating Lever has caused the Roller to reach its maximum throw. Adjust the Engaging Link Eccentric so the Carriage Clear Shift Rod is fully positioned to the rear. Do not adjust the Eccentric so that it will compress the Spring but will leave a slight amount of end play in the Shift Rod. When the Enter Dividend Key restores, the Engaging Link is to restore with clearance to the end of the Shift Rod, Fig. 1.

Oil all bearings: Shift Rod, Engaging Link, etc.

ADJUSTMENTS

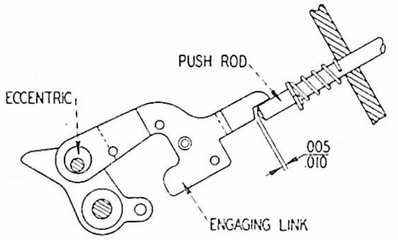


ST - C - D - S

ADJ. 27A LEFT SHIFT ENGAGING LINK: When the Dividend Tab Key is latched down, the Shift Interlock Lever is to be against the Right and Left Shift Forks without pressure or clearance. The end of the Left Shift Push Rod is not extended through the Left Shift Fork so clearance exists between the Clip and the Fork. When in Home Position the Engaging Link will have clearance to the Stud. Check this with the Return Clear Key.

Reason for Adjustment: If there is clearance between the Clip and the Left Shift Fork, the Left Shift can be disengaged too early when the Engaging Link is raised by the override action. The Push Rod will restore with enough force to drive the Left Shift out of mesh. This could leave the Carriage Shift Gear hanging up.

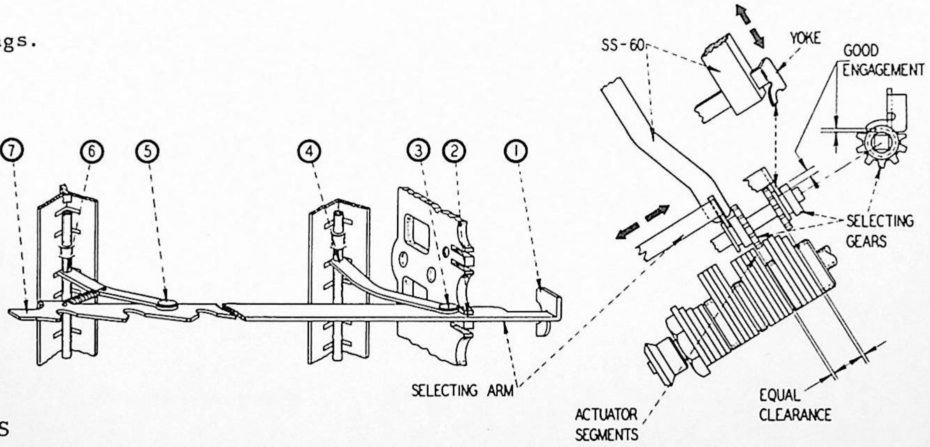
Oil the bearings.



ST - C - D - S

ADJ. 27B RETURN CLEAR ENGAGING LINK: The Engaging Link Eccentric is adjusted to obtain .005 - .010 clearance as illustrated. This is to insure the Engaging Link restores in front of the Push Rod.

Oil the bearings.



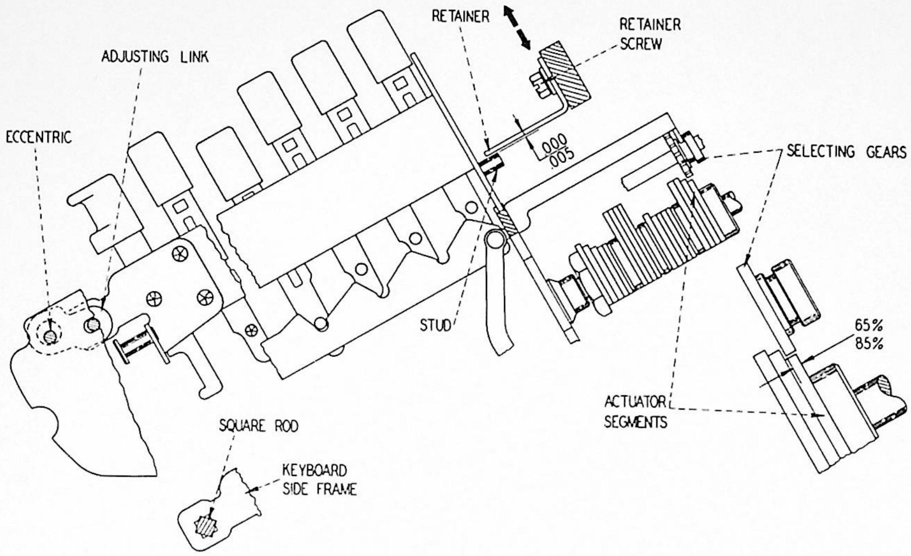
ALL MODELS

ADJ. 28A SELECTING ARMS: The Selecting Arm Yokes are to position in the groove of the Selecting Gears without bottoming, yet are to retain a good hold to prevent disengagement. Form the Selecting Arms up or down, as illustrated, with Tool SS-60. Also adjust the Yokes to position the teeth of the Selecting Gears for equal clearance to the Actuator Segments. Form as illustrated with Forming Tool SS-60.

After the above is accomplished, test each Selecting Arm for freeness. With a finger, pull each Selecting Arm down and retaining the finger on the Arm, allow the arm to slowly restore to test for any drag or bind. If a bind or drag exists, test the Arm at the seven positions indicated in the sketch. Use T-Forming Tool SS-17 or SS-60 to align the Arm.

Oil all bearings.

ADJUSTMENTS

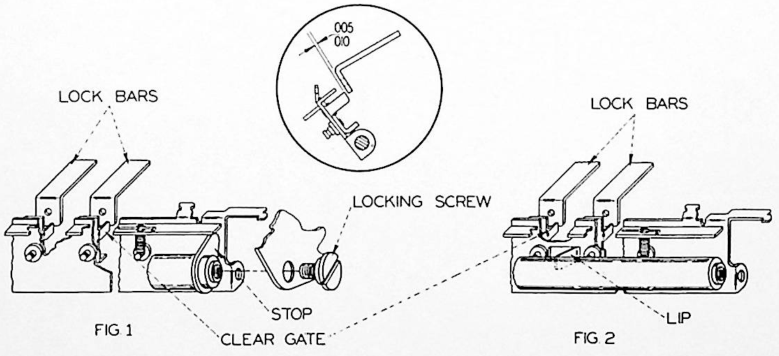


STW - ACG - SW - CW - DW - SRW

ADJ. 28B MAIN KEYBOARD: Loosen the screw on each end of the Square Rod. Adjust the Right and the Left Adjusting Link Eccentrics to move the Keyboard front or rear for obtaining approximately 65% to 85% engagement of the Selecting Gears with the Actuator Segments. To check the engagement, depress the Keys and push the top to the rear. This moves the Selecting Gears deeper, therefore, the Gears should not engage the next Actuator Segment. This is to insure that the next higher digit is not selected. For individual alignment of a Selecting Gear, form the Selecting Arm Yoke, Adj. 28A.

The Square Rod is to be turned at an angle to prevent slipping through the holes in the Kayboard Side Frame. Loosen the Retainer Screw and adjust the Retainer for .001 - .005 clearance to the Stud.

Oil the bearings.

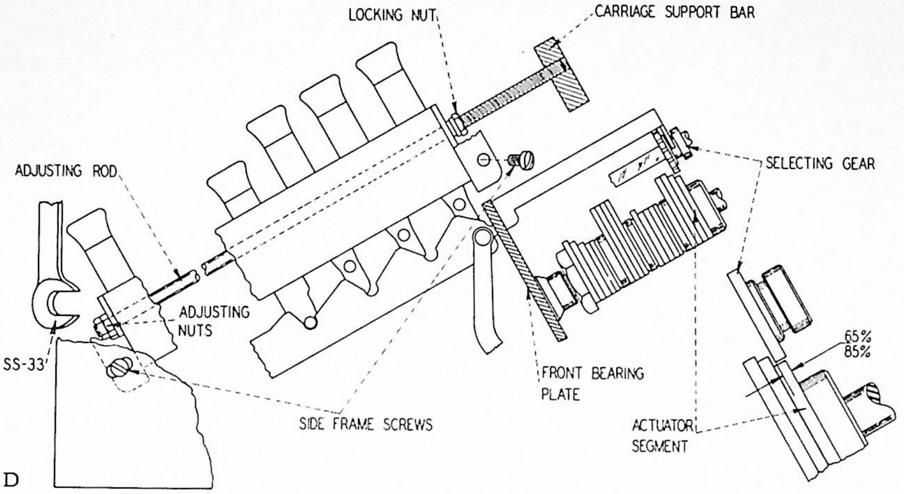


STW - ACG - SW - CW - DW - SRW

ADJ. 28C KEYBOARD CLEAR GATE STOP: Fig. 1, Early Style. Adjust the Stop to obtain .005 to .010 clearance between the Clear Gate and the Lock Bars. (See inset.) Tighten the Locking Screw to hold the Stop. Fig. 2, Revised Style. Form the Lip to obtain .005 to .010 clearance between the Clear Gate and the Lock Bar.

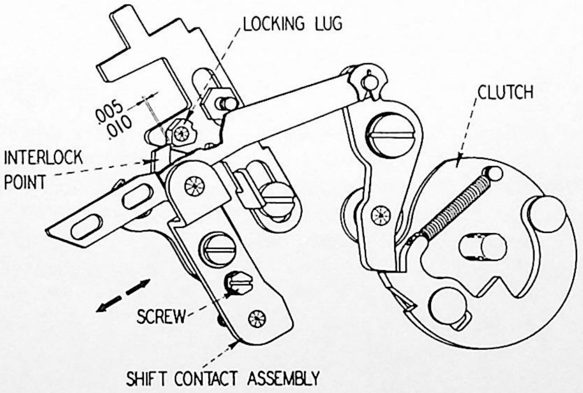
Oil the bearings.

ADJUSTMENTS



ST - S - C - D

ADJ. 29 MAIN KEYBOARD: To adjust, place the Keyboard in the machine and leave the Side Frame Screws loose (only two shown). Loosen the Locking Nut, leaving the two Adjusting Nuts tight. Run the long Adjusting Rods into the Carriage Support Bar, taking care to get them as evenly as possible by aligning the back of the Keyboard with the Front Bearing Plate. Place all 1's in the Keyboard and cycle the Drive Shaft slowly by hand and observe the engagement between the Selecting Gears and Actuator Segments. The Selecting Gears are to engage the Actuator Segments from 65% to 85%. Test with other Keys depressed. Hold the Adjusting Nuts and tighten the Locking Nuts. Observe that the Keyboard will move to the front, thus creating a deeper engagement of the Gears. To obtain the final adjustment, turn the Adjusting Rods, keeping the Locking Nut secure. If the entire Keyboard needs to be moved front or rear, turn each Rod the same amount. If the Keyboard needs more movement at one side than the other, turn each Rod the amount necessary. After the Keyboard is adjusted tighten the Side Frame Screws. For individual alignment of a Selecting Gear, form the Selecting Arm Yoke, Adj. 28A.

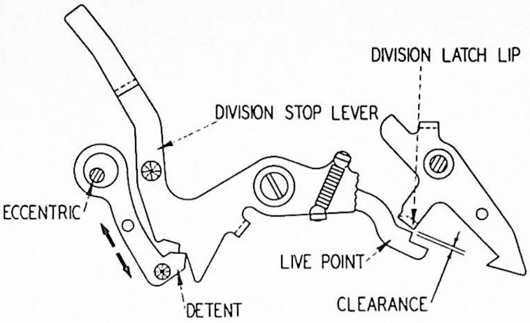


ALL MODELS

ADJ. 30 SHIFT CONTACT ASSEMBLY: When the Drive Shaft is rotated so the Clutch is in Home Position, loosen the Screw and move the Shift Contact Assembly so the Interlock Point clears the Locking Lug .005 to .010.

Oil the bearings.

ADJUSTMENTS



ALL MODELS

ADJ. 31 DIVISION STOP LEVER: Adjust the Eccentric up and to the rear so the Division Stop Lever will detent in both positions. When the Division Stop Lever is placed in the position shown, the Division Latch Lip will clear Live Point. The clearance will vary on machines, but is secondary to the proper detenting of the Stop Lever.

Oil the bearings.

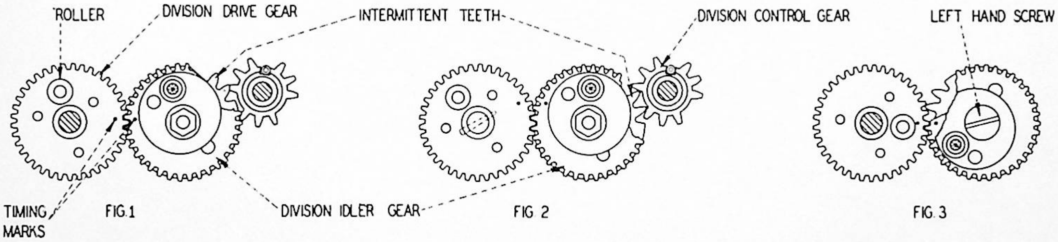
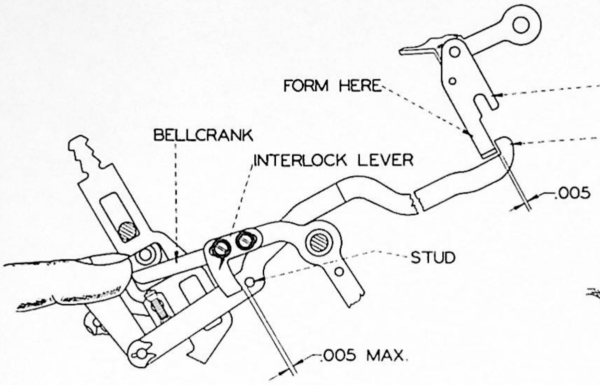


FIG.1 FIG 2 FIG 3

ALL MODELS

ADJ. 32 DIVISION IDLER GEAR: Fig. 1. Install the Division Idler Gear and the Division Drive Gear, but before meshing the two, align the Timing Marks (note position of the Roller and Intermittent Teeth). Mesh the Gears; turn the Division Drive Gear until its Hub has the large hole for the Taper Pin in an up position. Rotate the Drive Shaft to match up its pin hole. After the pin has been installed and the Gears rotated to Home Position the Intermittent Teeth are to be positioned as illustrated in Fig. 2 in relation to the Division Control Gear. Fig. 3. The Division Idler Gear may be removed without removing the Division Drive Gear. Rotate the Gears to the illustrated position, remove the Left Hand Screw (later models have a standard nut to hold the gear) and remove the Gear.

Oil the bearings.



ALL MODELS

FIG. 1

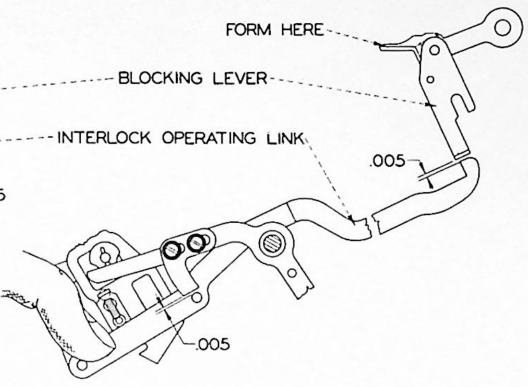
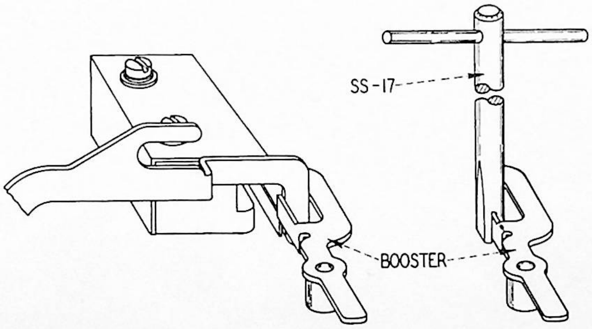


FIG. 2

ADJ. 33 FRONT LINE INTERLOCKS - CARRIAGE CLEAR AND ENTER-DIVIDEND: Step 1. Fig. 1. With the machine in Home Position, press on the Bellcrank to test for .005 maximum clearance at the closest point between the Interlock Lever and the Stud. Adjust the Interlock Lever. Step 2. Fig. 1. Depress the Enter-Dividend Key to position the Blocking Lever to the Interlock Operating Link. Form the Blocking Lever to obtain .005 clearance. Step 3. Fig. 2. With the machine in Home Position, pull the Interlock Operating Link towards the front. Check for a maximum of .005 clearance between the Interlock and the Stud and between the Blocking Lever and the Link. A close clearance may restrict the forward movement of the Interlock Operating Link.

Oil the bearings.



ALL MODELS

ADJ. 34 SWITCH SETTING - MICRO SWITCH: Adjust the micro switch Booster with T-Forming Tool SS-17 so the switch closes just prior to the Clutch releasing.

Wipe up oil from around the Micro Switch and remove oil that may be on it.

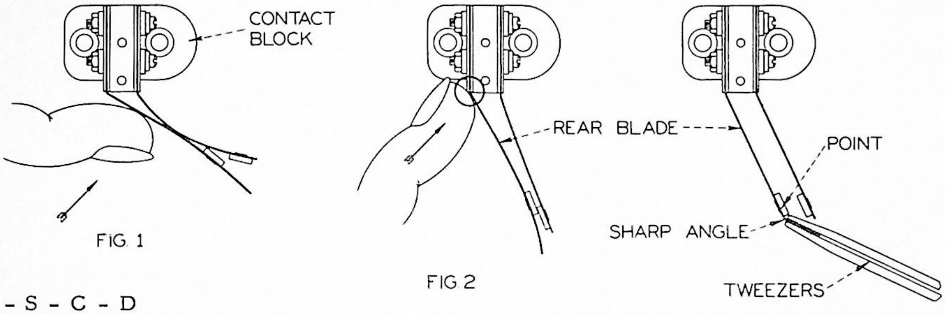


FIG. 1

FIG 2

EARLY ST - S - C - D

ADJ. 34-1 CONTACT BLADE - GRAY LINE: Prior to installing a new set of Contact Blades, place them in an extra Contact Block and form as illustrated. This gives them their tension. Fig. 2. The motor should start ahead of the Clutch releasing on a slow depression of the Plus Key. To increase the motor starting, close up the Blades by pressing on the Rear Blade at the point illustrated. Do not form in the center of the Blade for this would destroy its tension. Fig. 3. When the motor is starting too early, form the Rear Blade at the bottom at a sharp angle to the Point.

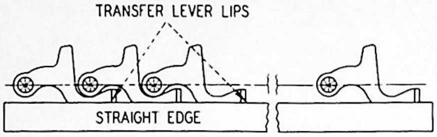


FIG 1

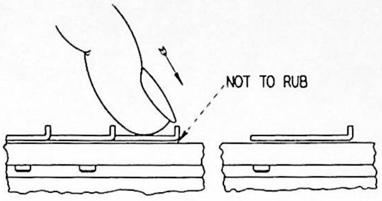


FIG. 2

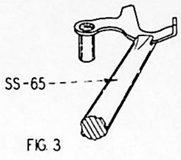
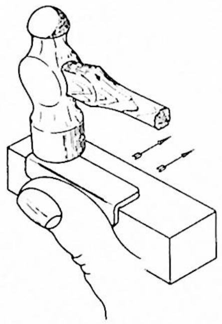


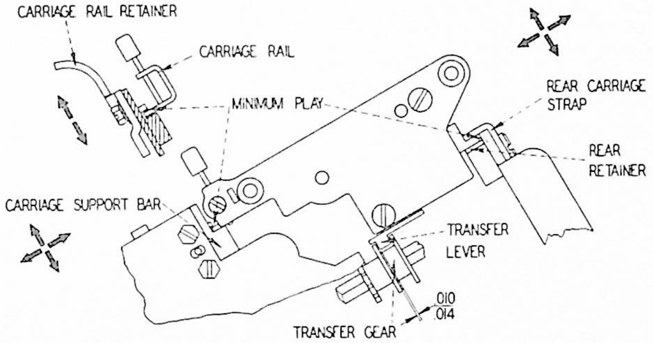
FIG. 3

ALL MODELS

ADJ. 35A TRANSFER LEVER ALIGNMENT: Fig. 1. The front edge of the Transfer Lever Lips should be in a straight line and parallel to the Carriage Frames. Test with a straight edge. Fig. 2. The Transfer Levers must be free and should not rub on the Carriage Frame when moved out and in. Test with a slight downward pressure. Fig. 3. Adjust for clearance using T-Forming Tool SS-65.

Oil the Transfer Levers.



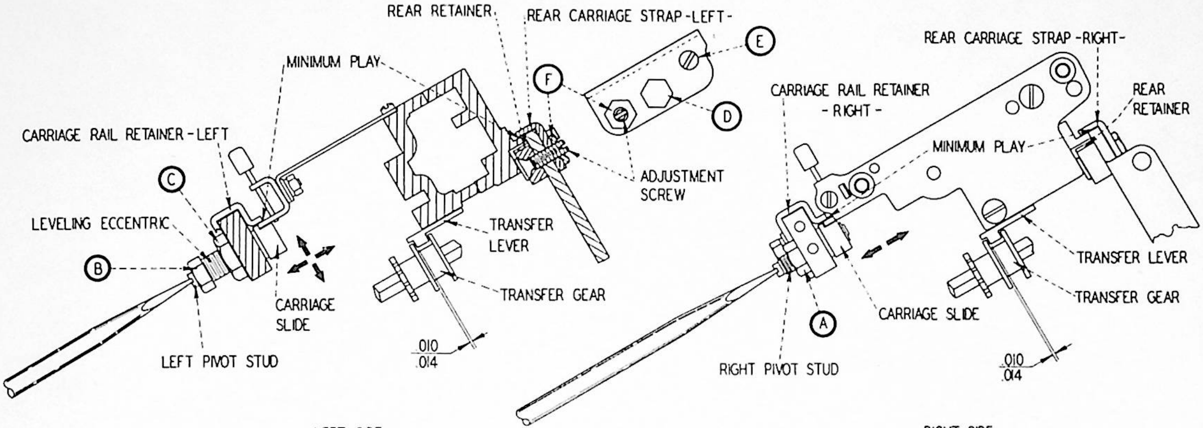


STW - SW - CW - DW - SRW

ADJ. 35B CARRIAGE SETTING - EARLY STYLE SUPPORT BAR: Step 1. Loosen the right and the left Carriage Rail Retainers. Step 2. Remove or loosen the right and the left Rear Carriage Straps. Step 3. Adjust the Carriage Support Bar to the front or the rear to obtain .010 to .014 clearance between the Transfer Levers and the Transfer Gears. The right end of the Support Bar is adjustable to the front and the rear only. The left end of the Support Bar is adjustable to the front and the rear, and up and down. Step 4. Adjust the left end of the Support Bar up or down to level the Carriage. The Carriage should rest on the full length of the Carriage Support Bar and the Rear Retainer. Step 5. Adjust the Carriage Rail Retainers so there is a minimum of play between them and the Carriage Rail. The Carriage must be held with a minimum of play but without binds. Step 6. The Rear Straps are to be adjusted one at a time by peening or filing to remove the excess front and rear play. To remove play, peen as illustrated. Remove the Strap and hold it on a suitable block. Tap along the Strap with SS-1 to spread the Strap evenly in the direction of the arrows. When the Carriage is too tight, file the Strap where it contacts the Carriage. To remove the up and down play, tap down on the Straps lightly. The Carriage is to be free moving without binding.

Oil all Sliding Surfaces.

ADJUSTMENTS



LEFT SIDE

RIGHT SIDE

STW - ACG - SW - CW - DW

ADJ. 35C CARRIAGE SETTING - REVISED STYLE SUPPORT BAR - 'W' LINE: Step 1. Loosen the right and the left Carriage Rail Retainers. Step 2. Remove or loosen the right and the left rear Carriage Straps. Step 3. Loosen Nut A and turn the Right Pivot Stud to move the Carriage Slide and the Carriage to the front or the rear to obtain .010 to .014 clearance between the Transfer Levers and the Transfer Gears. Tighten Nut A. Step 4. Loosen Nut B and turn the Left Pivot Stud to move the Carriage Slide and the Carriage to the front or the rear to obtain .010 to .014 clearance between the Transfer Levers and the Transfer Gears. Tighten Nut B. Step 5. Loosen Nut C and turn the Leveling Eccentric to raise or lower the left end of the Carriage Slide so the Carriage is level. The Carriage should rest on the full length of the Carriage Slide and the Rear Retainer. Tighten Nut C. Step 6. Adjust the Carriage Rail Retainers so there is a minimum of play between them and the Carriage Rail. The Carriage must be held with a minimum of play but without binds. Step 7. Have Nut F loose but not backed out of the Left Rear Carriage Strap. Tighten Screw D and E. Test for up and down movement of the Carriage while moving it from left to right. Remove all movement by tapping down on the Strap. Tap lightly. Next, turn in the Adjustment Screw to remove the front and rear play of the Carriage. Do not turn in too much because the Carriage will be bowed. Hold the Adjustment Screw and tighten Nut F. Repeat this procedure with the Right Rear Carriage Strap. (For machines having the early type Carriage Straps see Step 6, Adj. 35B).

Oil all Sliding surfaces.

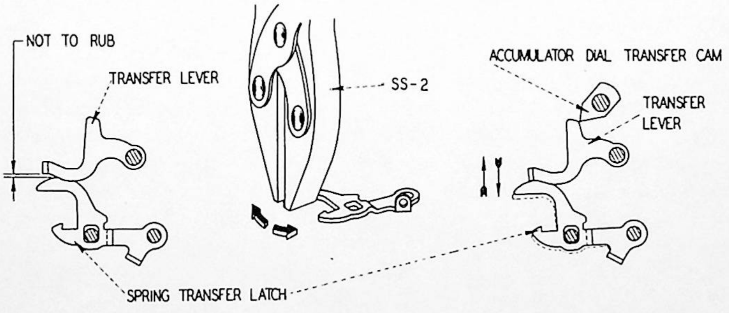


FIG. 1 FIG. 2

ALL MODELS

ADJ. 35D SPRING TRANSFER LATCH: After the Carriage is set for the .010 - .014 clearance, test the Spring Transfer Latch. The Transfer Lever is: (a) not to bottom the Spring Transfer Latch (Fig. 2); (b) is to be close enough to delatch the Spring Transfer Latch; (c) is not to rub the Spring Transfer Latch (Fig. 1). Manually position an Accumulator Dial Transfer Cam, as shown, and test for movement of the Spring Transfer Latch away from the Transfer Lever. If the Latch does not have movement away from the Lever, then adjust as shown. The clearance between the Lever and the Latch may not be the same as the Carriage setting clearance of .010 - .014.

Oil the bearings.

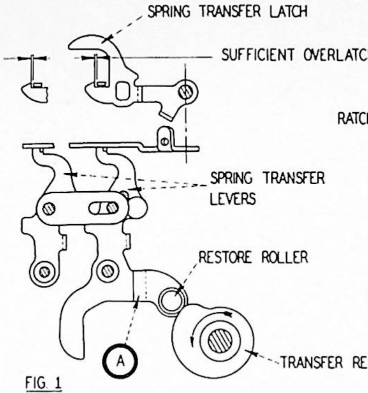


FIG. 1

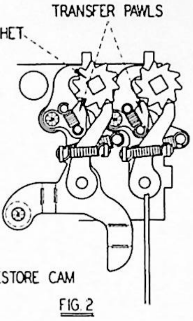
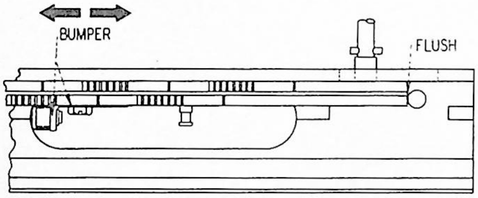


FIG. 2

ALL MODELS

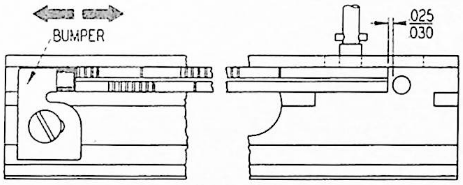
ADJ. 35E SPRING TRANSFER RESTORE: Trip off both Spring Transfer Latches and rotate the Drive Shaft. When the Transfer Restore Cam, Fig. 1, is on the high point of movement with the Restore Roller, the Spring Transfer Levers should restore enough to insure the latching and overthrow of the Transfer Pawls into the next Ratchet Tooth space, Fig. 2. Adjust by twisting at A. The overlatch of the upper ends of the Spring Transfer Levers to the Spring Transfer Latch should be sufficient to insure latching.

Oil the bearings.



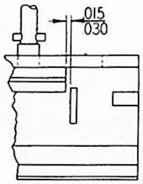
SPLIT RACKS

FIG. 1



ONE PIECE RACK

FIG. 2



OLD STYLE
WITH INTERLOCK

FIG. 3

STW - ACG - SW - CW - DW - SRW

ADJ. 36A ACCUMULATOR CLEAR RACK - RIGHT SIDE: The adjustment of the Accumulator Clear Rack on the right end has changed from time to time, therefore, the above clearances are given as a guide. Fig. 1 illustrates the adjustment for the Split Racks. The Carriage Frame has a round hole. On this style, the Rack is adjusted by the Bumper so the right end is flush with the hole edge. This is done on the Model ACG and models having full capacity carryover or the half cent feature. Fig. 2 illustrates the adjustment for the One Piece Racks. The Rack is adjusted by the Bumper located at the extreme left end of the carriage, for .025 - .030 clearance to the hole edge. This is done on models that do not have full capacity or the half cent feature. Fig. 3 illustrates the clearance of the Rack for the early model Fridens having the long slot with an Interlock.

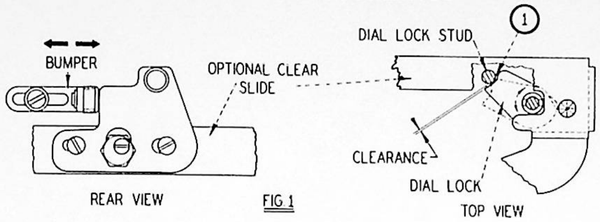
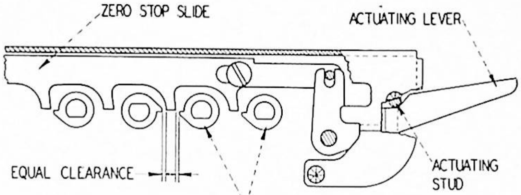


FIG 1



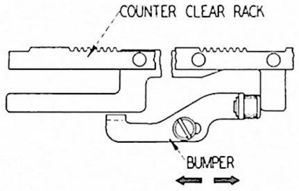
ALL MODELS

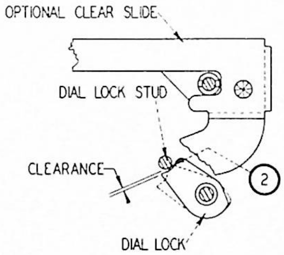
FIG 2

ADJ. 36B OPTIONAL CLEAR SLIDE BUMPER - STANDARD - ACG - COMPLETE TRANSFER: STANDARD Fig. 1. Adjust the Bumper to obtain a slight drag at Point 1 between the Dial Lock and the Dial Lock Stud as the Dial Lock is turned in and out. This will leave a small clearance between the Stud and the Dial Lock when the Dial Lock is turned in. This small clearance insures that the Optional Clear Slide is resting on the Bumper.

ACG - COMPLETE TRANSFER: Fig. 2. Turn adjacent Dials to a 5 and a Zero. Adjust the Bumper so the Actuating Stud contacts the Actuating Lever and holds the Zero Stop Slide for approximately equal clearance between the Zero Stop Cams. The Zero Stop Slide does not have a bumper. Because the Zero Stop Slide must actuate other parts at the instant the Optional Clear Slide starts moving, the Actuating Lever rests on the Actuating Stud.

Oil bearing points.

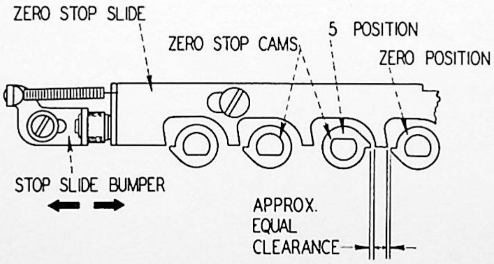




ALL MODELS

ADJ. 36C COUNTER CLEAR RACK BUMPER: Adjust the Bumper to cause a slight drag between the Dial Lock and the Dial Lock Stud at Point 2 when the Dial Lock is turned in and out. This will leave a small clearance between the Stud and the Dial Lock when the Dial Lock is turned in. This small clearance insures that the Counter Clear Rack is resting on its Bumper.

Oil bearing points.

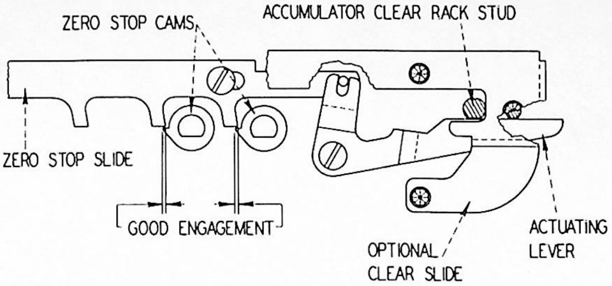


ALL MODELS

ADJ. 36D ACCUMULATOR DIAL ZERO STOP SLIDE: Turn adjacent dials to a Zero and a 5. Adjust for approximate equal clearance of the Zero Stop Slide to the Zero Stop Cams by moving the Stop Slide Bumper.

Light film of oil on Stop Slide. Excess oil will cause sluggish action.

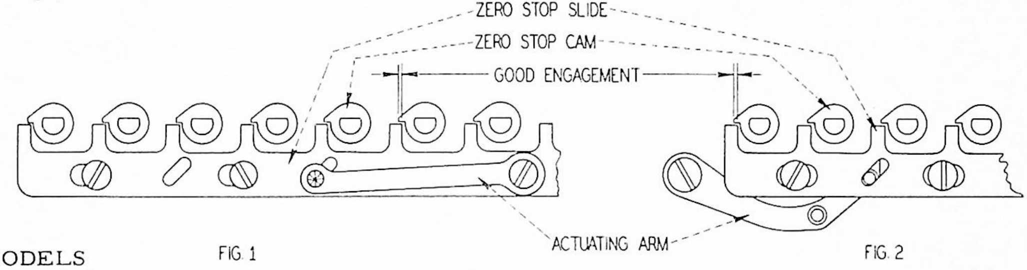
ADJUSTMENTS



ALL MODELS

ADJ. 36E ACCUMULATOR DIAL STOP SLIDE ACTUATING LEVER: When the Accumulator Clear Rack Stud and the Optional Clear Slide are cleared manually to their maximum throw, the Zero Stop Slide should have a good engagement with the Zero Stop Cams but should not bottom on the full movement of the Slide. Form the Actuating Lever. A good test is to turn any odd numbered Dial, 1st, 3rd, 5th order, to a number 1 and observe that the Stop Slide moves into good engagement before these Dials turn to Zero as the Accumulator Clear Rack is actuated. If the Stop Slide does not engage deep enough as the Dials turn to Zero, the Zero Stop Cams will slip by and a lock up will occur.

Oil bearing points.



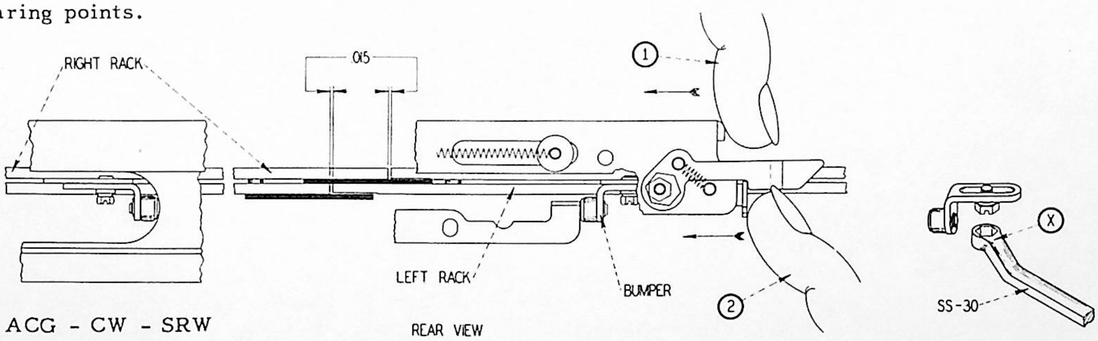
ALL MODELS

FIG. 1

FIG. 2

ADJ. 36F COUNTER DIALS ZERO STOP SLIDE: Fig. 1, Revised Style. When the Counter Clear Rack is manually moved to its maximum throw to the right, the Zero Stop Slide should move under the Zero Stop Cams with a good engagement but not to bottom. Adjust by twisting the Actuating Arm. Early Style, Fig. 2. The Stop Slide movement and engagement is the same. Adjust by twisting the Actuating Arm. A good test is to turn any even numbered Dial, 2nd, 4th, 6th order, to a number 1 and observe that the Stop Slide moves into good engagement before these Dials turn to Zero as the Counter Clear Rack is actuated. If the Stop Slide does not engage deep enough as the Dials turn to Zero, the Zero Stop Cams will slip by and a lock up will occur.

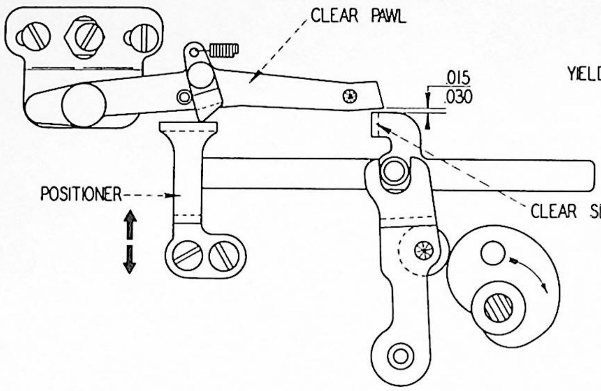
Oil bearing points.

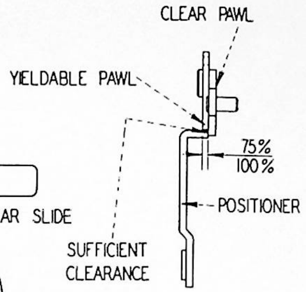


STW - ACG - CW - SRW

REAR VIEW

ADJ. 36G CLEARANCE BETWEEN RIGHT AND LEFT ACCUMULATOR RACKS: When the Right Accumulator Clear Rack is unlocked so it does not move with the Optional Clear Slide, the Left Accumulator Clear Rack should not contact the Right Rack when moved to the right. There should be .015 clearance between the two. To test, unlock the Right Rack and move the Optional Clear Slide to the right with Finger 1 and the Left Rack with Finger 2. Adjust the Bumper with SS-30 (grinding at X will assist in clearance to the Optional Clear Slide). On some Carriages the clearance can be seen, on others it is necessary to allow the Racks to touch then back off the Left Rack. This adjustment can be made very easily before the Carriage Frames are assembled.





ALL MODELS

FIG. 1

FIG. 2

ADJ. 36H LAST ORDER POSITIONER: Fig. 1. Place the Carriage in second position. Manually move the Clear Slide to the right. Raise or lower the Positioner to obtain .015 - .030 clearance between the Clear Pawl and the Clear Slide. Fig. 2. Adjust the Positioner in or out to obtain a 75% to 100% engagement with the Yieldable Pawl. Check for sufficient clearance between the end of the Clear Pawl and the Positioner as the Carriage moves to the left.

Keep excess oil and grease off the Clear Slide.

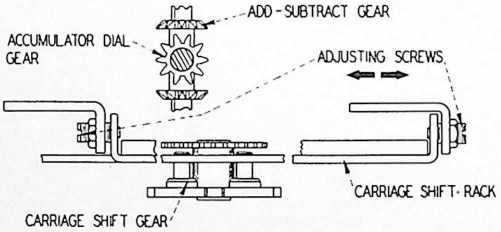


FIG. 1

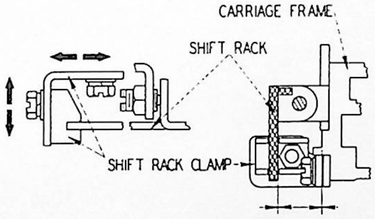
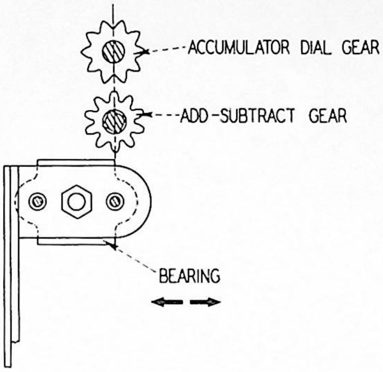


FIG. 2

ALL MODELS

ADJ. 36J CARRIAGE SHIFT RACK: Step 1, Fig. 1. With the Carriage Shift Rack and the Carriage Shift Gear engaged, adjust the Carriage to the right or the left by the Adjusting Screws. When the Add - Subtract Gate is moved from the Plus to Minus position and back, the Add - Subtract Gears should cause a minimum of motion in the Accumulator Dial Gears. Do not bow the Shift Rack with the Adjusting Screws but have them cause a slight drag to the Shift Rack when it is moved up or down. Step 2, Fig. 2. Adjust the Shift Rack Clamp so the Shift Rack is parallel to the Carriage Frame.

ADJUSTMENTS



10 BANK MODELS

ADJ. 36K EXTRA TRANSFER SHAFTS BEARING: Adjust the Bearing to the right or the left to eliminate any movement in the Accumulator Dials when the Add - Subtract Gate is moved from Plus to Minus. The Add - Subtract Gears should cause a minimum of motion of the Accumulator Dial Gears. (Some machines do not have the movable Bearing).

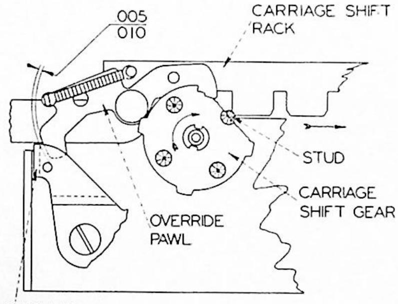


FIG 1

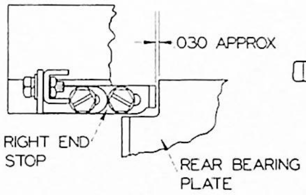


FIG 2

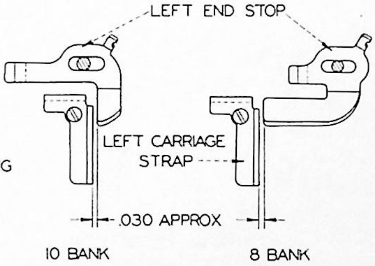


FIG 3

STW - SW - CW - DW - C - D

ADJ. 36L CARRIAGE END STOPS - EARLY STYLE SMOOTH SHIFT: Step 1. When the Carriage is to the extreme left, rotate the Carriage Shift Gear so a Stud is at the point illustrated with the Carriage Shift Rack. This moves the Carriage slightly to the left. Adjust the Right End Stop against the Rear Bearing Plate. Step 2. Shift the Carriage to the extreme right and position the Carriage Shift Gear in a similar position to Step 1. Adjust the Left End Stop against the Left Carriage Strap. When the Carriage Shift Gear is centralized, with the Carriage at either end, there will be approximately .030 clearance between the End Stops and the Bearing Plate and the Left Carriage Strap, Fig. 2 and 3. Step 3, Fig. 1. The Override Pawl should clear the Stop Lip by .005 to .010 when the Carriage reaches its greatest travel to the left on the override action. Adjust the Stop Lip.

Light grease on Carriage Shift Gear Studs.

ADJUSTMENTS

FIG. 1

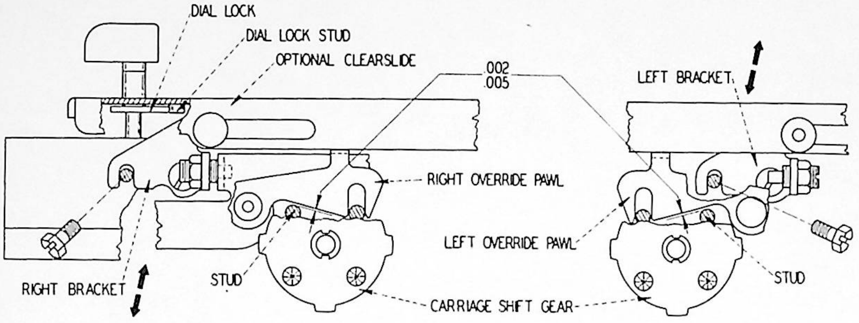


FIG. 2

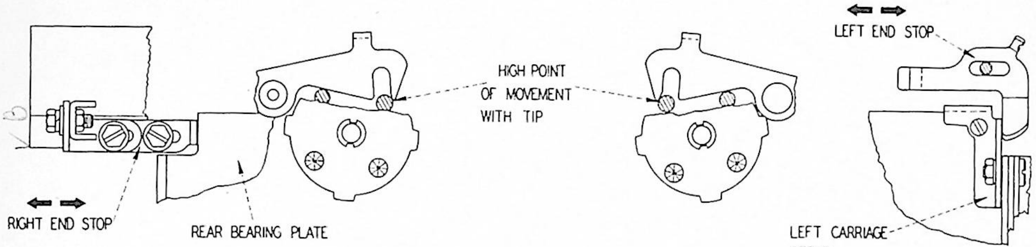
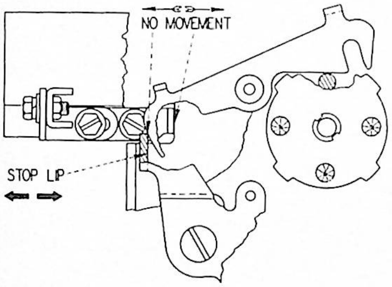


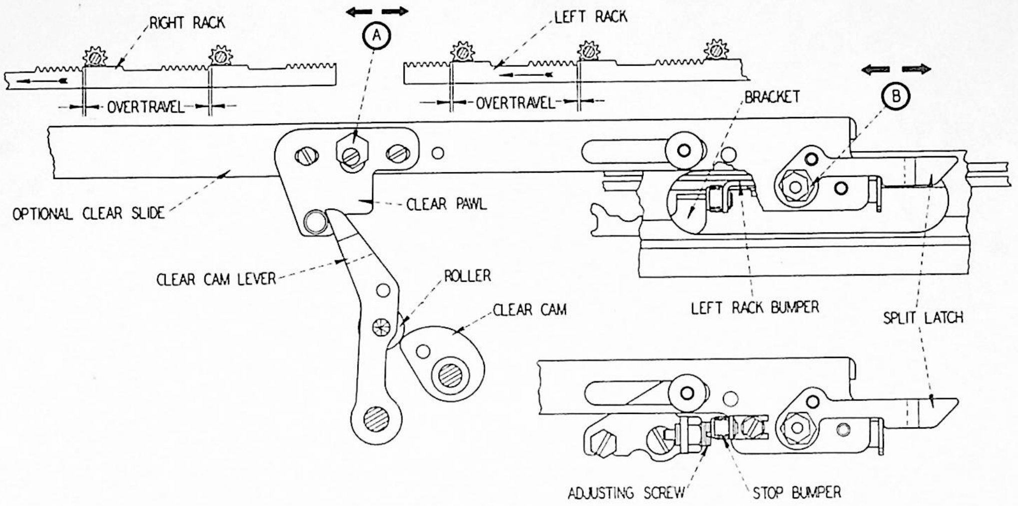
FIG. 3



STW - SW - CW - DW - SRW

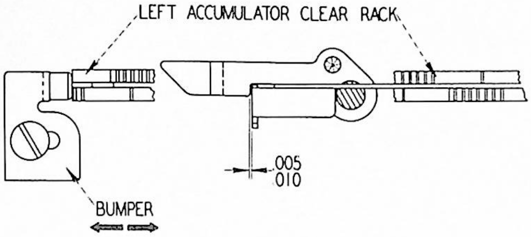
ADJ. 36M CARRIAGE END STOPS AND RACK HEIGHT - REVISED TYPE: Step 1, Fig. 1. With the Carriage shifted to the extreme left and the Carriage Shift Gear centralized, adjust the Right Bracket to obtain .002 to .005 clearance between the Right Override Pawl and the Stud on the Carriage Shift Gear. Step 2, Fig. 1. With the Carriage shifted to the extreme right and the Carriage Shift Gear centralized, adjust the Left Bracket to give .002 to .005 clearance between the Left Override Pawl and the Stud on the Carriage Shift Gear. After adjusting for the clearance, test that the Dial Locks do not miss the studs on the Optional Clear Slide. Step 3, Fig. 2. With the Carriage shifted to the extreme left and the Carriage Shift Gear rotated so a Stud is positioned on the high point of movement with the tip of the Right Override Pawl, as illustrated, adjust the Right End Stop against the Rear Bearing Plate. Step 4, Fig. 2. With the Carriage shifted to the extreme right and the Carriage Shift Gear rotated so a stud is on the high point of movement with the tip of the Left Override Pawl, as illustrated, adjust the Left End Stop against the Left Carriage Strap. Step 5, Fig. 3. With the Carriage in the extreme left position, rotate the Carriage Shift Gear for maximum movement of the Override Pawl as illustrated. Adjust the Stop Lip for no Carriage movement between the Right End Stop and the Stop Lip. Make sure the Override Pawl does not bind. Check the preceding in all positions of the Carriage Shift Gear.

Light grease on Carriage Shift Rack Studs.



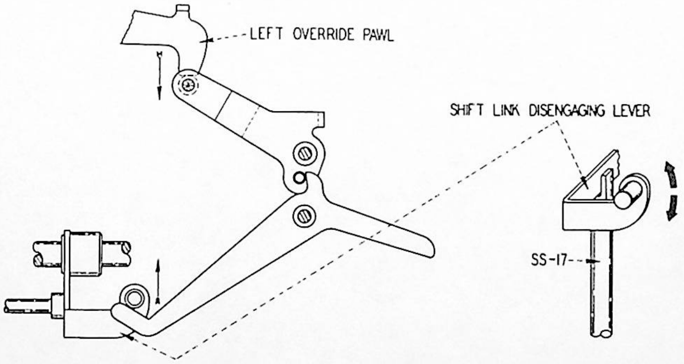
ALL MODELS

ADJ. 36N ACCUMULATOR DIAL CLEARANCE: Step 1. The Right Accumulator Dial Clear Rack should clear the Dials from 9 to zero and then have a slight over-travel. To check this, place a series of 9's in the Accumulator Dials, depress the Carriage Clear Key and cycle the Drive Shaft by hand. After the even numbered Dials, second, fourth, sixth orders have reached zero, check the amount of over-travel the Optional Clear Slide and the Right Rack will make before the Clear Cam passes the high point of movement on the Roller of the Clear Cam Lever. To obtain the proper dial clearance and the slight over-travel, adjust the Clear Pawl by turning Eccentric A. Step 2. When the Split Latch is engaged, the Left Accumulator Dials are to clear from 9 to zero when the Clear Cam is on the high point of movement with the Roller. Adjust Eccentric B to position the Left Rack Bumper against the Bracket without compressing the rubber. Step 3. The Optional Clear Slide Stop Bumper should contact the Adjusting Screw but should not compress the rubber when the Clear Cam is on the high point of movement of the Roller.



STW - ACG - CW - SRW

ADJ. 36P SPLIT CLEAR LATCH CLEARANCE: Adjust the Left Accumulator Rack Bumper to obtain .005 to .010 clearance as illustrated. This Bumper is located inside the Carriage at the left end.



STW - ACG - SW - CW - DW - SRW - C - D

ADJ. 37 RIGHT SHIFT DISABLING LEVER: When the Carriage is shifted to the extreme right and the Right Shift Key held down, the Carriage Shift Gear should disengage on the first override action. Form the Shift Link Disengaging Lever up or down.

Oil the bearings.

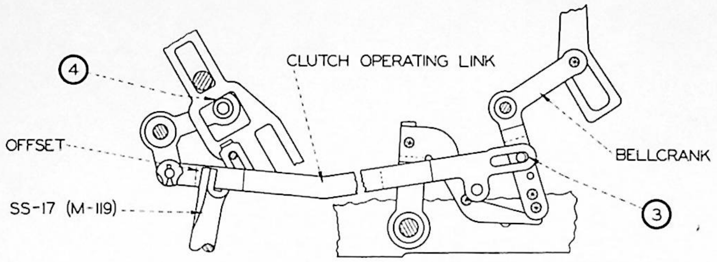


FIG. 1

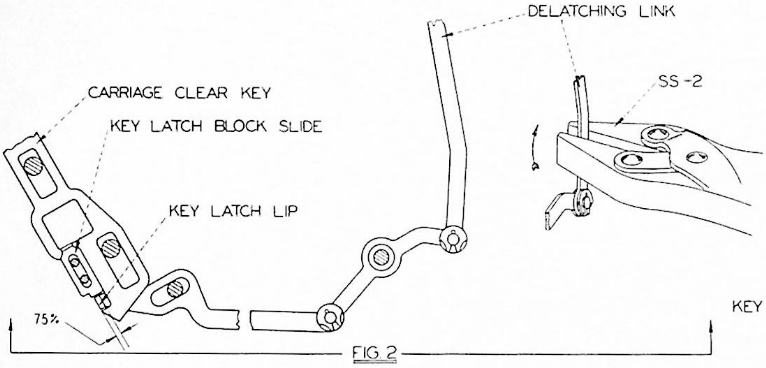


FIG. 2

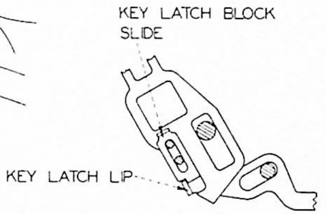
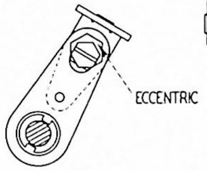


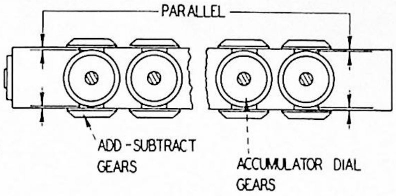
FIG. 3

STW - ACG - CW - DW - SRW

ADJ. 38 CLUTCH RELEASING AND KEY LATCHING - CARRIAGE CLEAR: Fig. 1. To obtain a simultaneous Clutch Releasing and Key Latching, shorten or lengthen the Clutch Operating Link at the Offset by twisting with T-Forming Tool SS-17. After forming, test for freeness of the Link. NOTE: Do not shorten the Link to the extent that it pulls on the Bellcrank. On some machines a simultaneous Clutch Releasing and Key Latching cannot be obtained; the Clutch will release earlier. For these machines, adjust the Link for a slight amount of play between Points 3 and 4. Fig. 2. The Key Latch Lip should have at least 75% engagement with the Carriage Clear Key when in the latched position. Form the Delatching Link by twisting with Pliers SS-2 in the direction of the Arrow for more engagement. If the Carriage Clear Key is held depressed, the Key Latch Block Slide should remain on top of the Key Latch Lip until the Clear action is completed and then should drop behind the Key Latch Lip. Fig. 3. When the Division Stop Lever is held to the rear, the Key Latch Lip is to clear the Carriage Clear Key.

Oil the bearings.





STW - ACG - SW - CW - DW - SRW

ADJ. 39 ADD - SUBTRACT GATE ALIGNMENT: With the Carriage installed, the Add - Subtract Gate should hold the Add - Subtract Gears parallel to the Accumulator Dial Gears. Adjust the Eccentric at the left end of the Add - Subtract Gate. This alignment applies to all models. Some models do not have the eccentric adjustment but the alignment can be obtained by twisting the Add - Subtract Gate.

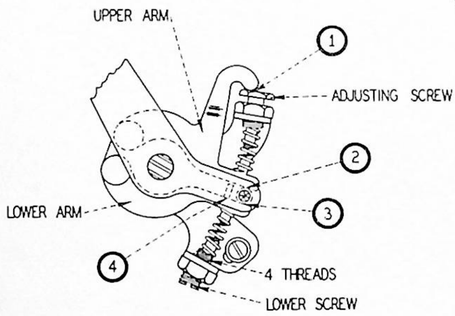


FIG. 1

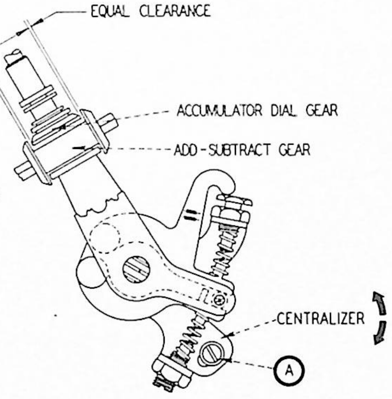


FIG. 2

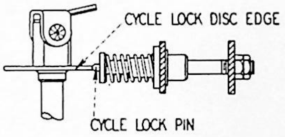
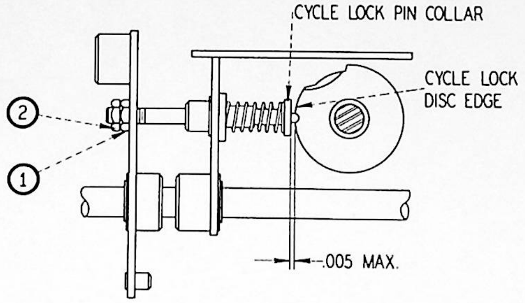


FIG. 3

ALL MODELS

ADJ. 40A ADD - SUBTRACT GATE CENTRALIZER: Step 1, Fig. 1. Four points of Contact. In Home Position the Centralizer Arms should have Four Points of Contact. The Upper Arm should contact at Points 1 and 2 and the Lower Arm should contact at Points 3 and 4. The contact at these points is controlled by the Adjusting Screw. Step 2, Fig. 2. Adjust the Centralizer at Screw A to position the Add - Subtract Gears for equal clearance to the teeth of the Accumulator Dials Gears. When this is proper the point of the Cycle Lock Pin should ride in the approximate center of the Cycle Lock Disc Edge, Fig. 3. Sometimes it is necessary to twist the inside gate arm to align the Cycle Lock Pin.

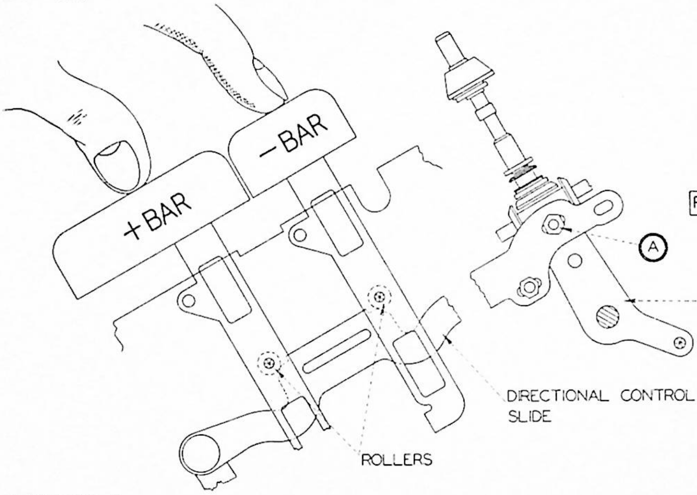
NOTE: The Lower Screw is pre-set at the factory with approximately four threads extending through the bracket.

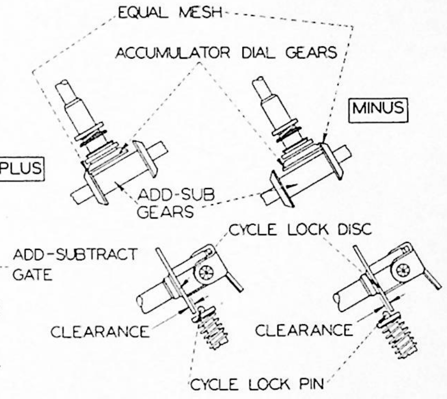


ALL MODELS

ADJ. 40B CYCLE LOCK PIN: Observing from the rear of the machine, position the Add - Subtract Gate in Plus or Minus and partially rotate the Drive Shaft. Adjust for a maximum of .005 clearance between the edge of the Cycle Lock Disc and the face of the Cycle Lock Pin Collar by turning Nut 1. Lock the clearance with Nut 2.

Oil the Pin.





ALL MODELS

FIG. 1

FIG. 2

ADJ. 40C DIRECTIONAL CONTROL SLIDE - PLUS AND MINUS: Fig. 1. Have Nut A loose, depress the Plus and the Minus Keys simultaneously until the Rollers have equal contact with the Directional Control Slide, as illustrated. Tighten Nut A. Observe that the Add - Subtract Gate does not move when tightening the Nut.

To test for equal throw of the Directional Control Slide and for equal mesh of the Add - Subtract Gears with the Accumulator Dial Gears, depress and hold the Plus Bar. Sight under the Carriage from either the right or the left and observe the depth of engagement the Add - Subtract Gears have with the Dial Gears. Next depress the Minus Key and again sight for the amount of mesh the Add - Subtract Gears have with the Dial Gears. The depth of meshing should be approximately equal. If one side meshes too deep, adjust at Nut A. If the Gate throw is limited or the Plus or Minus Key binds, check Adj. 40H, 51B, 60E.

NOTE: The Cycle Lock Pin should clear the Cycle Lock Disc in Plus and Minus, Fig. 2. Do not adjust at Nut A to obtain this clearance. Re-check Adj. 40A.

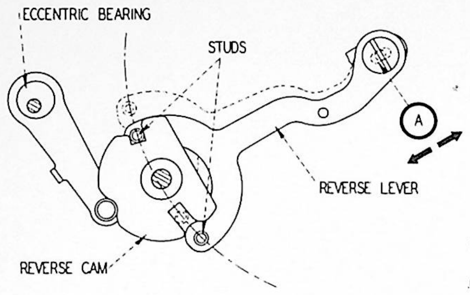


FIG. 1

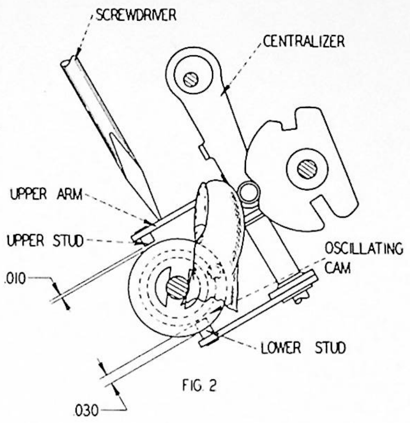


FIG. 2

ALL MODELS

ADJ. 40D COUNTER REVERSE CAM, LEVER, AND OSCILLATOR ARM - EARLY STYLE: Step 1, Fig. 1. Adjust the Eccentric Bearing to position the Reverse Cam to allow the Reverse Lever to swing in and out of the slots without the Studs contacting the slot edges. Step 2. Adjust the Reverse Lever at Screw A so the Studs have equal clearance in the slots. Step 3, Fig. 2. Release the Clutch and rotate the Drive Shaft by hand until the Upper Stud of the Oscillator Arm is over the wide place of the Oscillating Cam. Test for the upper clearance by placing a finger on the Centralizer and a screwdriver on the Upper Arm and alternate the motion between the two which will test for the clearance of the Upper Stud. The Upper Stud should clear the Cam by .010 and the Lower Stud should have .030 engagement. If the adjustment of the Centralizer, Step 1, did not obtain these clearances it will be necessary to form the Arms.

Oil the bearings. Grease the Oscillating Cam grooves.

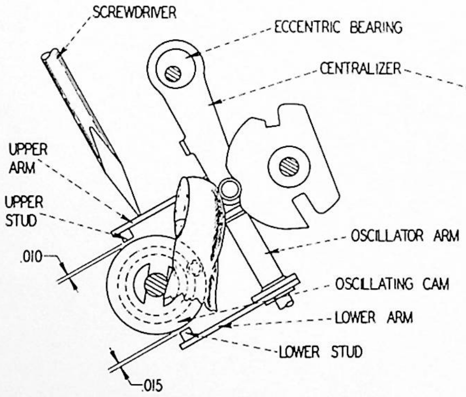


FIG. 1

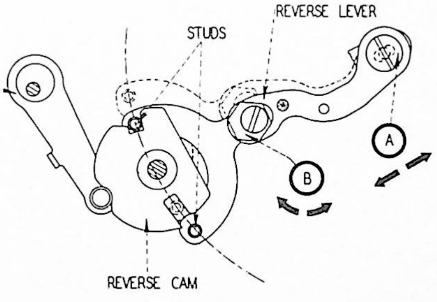
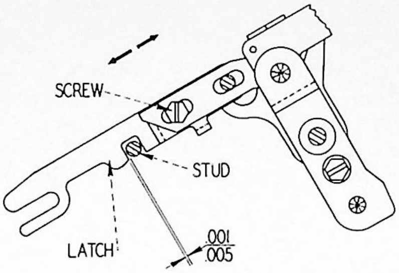


FIG. 2

STW - ACG - SW - CW - DW - SRW

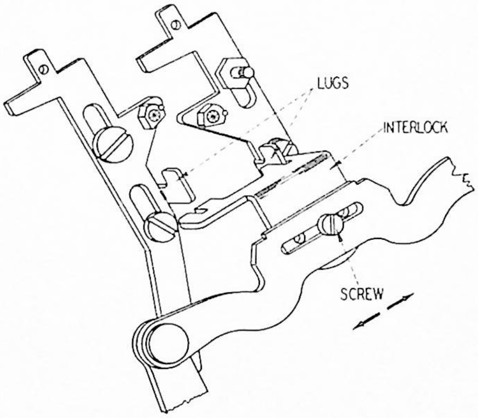
ADJ. 40E COUNTER REVERSE CAM, LEVER, AND OSCILLATOR ARM - REVISED STYLE: Step 1, Fig. 1. Release the Clutch and rotate the Drive Shaft until the Upper Stud of Oscillator Arm is over the wide place of the Oscillating Cam. Test for .010 clearance by placing a finger on the Centralizer and a Screwdriver on the Upper Arm and alternate motion between the two. Adjust the Eccentric Bearing to obtain this clearance. Step 2. Test with a .015 shim for clearance between the Lower Stud and the Oscillating Cam. Form the Lower Arm if necessary. Step 3, Fig. 2. Adjust the Reverse Lever at Screw A and at Eccentric B to allow the Studs to swing in and out of the slots without contacting the slot edges.

Oil the bearings. Grease the Oscillating Cam grooves.



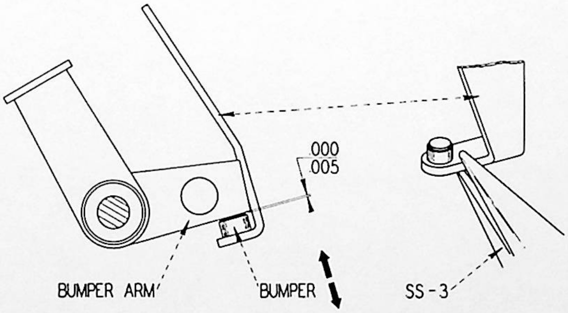
ALL MICRO SWITCH TYPE MODELS

ADJ. 40F CLUTCH RELEASE LATCH: With the Drive Shaft in Home Position, lift up on the Latch and allow it to restore on the Stud. The Latch should drop over the Stud with .001 to .005 clearance to the front of the Slot. Adjust at the Screw. Test by pulling the Add Key down and depressing the Plus and Minus Keys. Slowly restore the Keys and observe that the Latch positions onto the Stud.



ALL MODELS

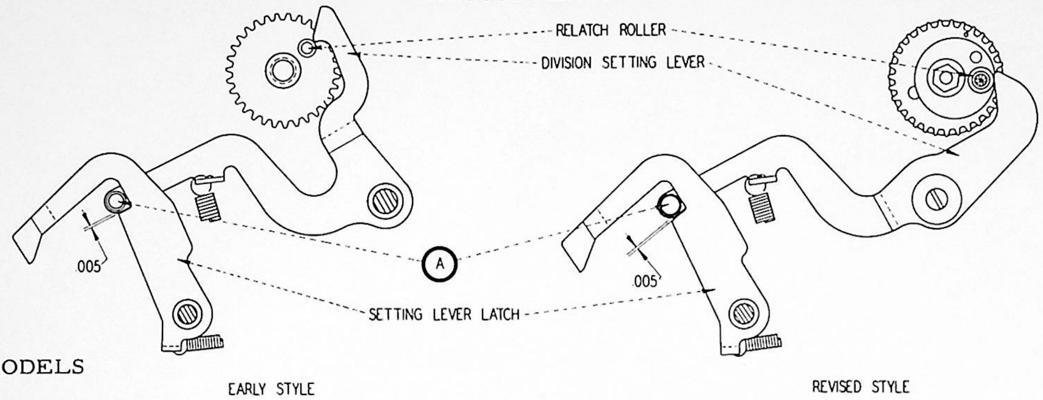
ADJ. 40G SHIFT KEY INTERLOCK: When each Shift Key is depressed its Lug should move freely into the Interlock without contacting. Adjust the Interlock at the Screw or if necessary form the Lugs for final alignment.



ALL MODELS

ADJ. 40H ADD - SUBTRACT GATE BUMPER: Depress and hold the Plus Key. The Bumper Arm should clear the Bumper .000 - .005 clearance. Adjust by forming as illustrated.

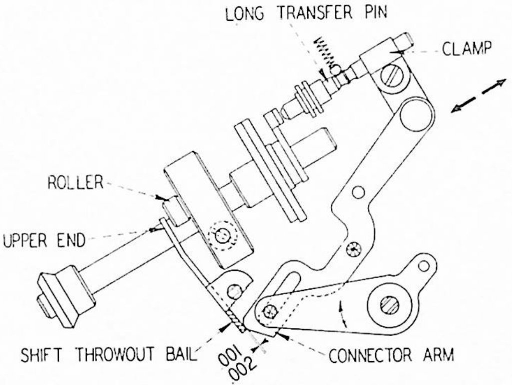
ADJUSTMENTS



ALL MODELS

ADJ. 41A DIVISION SETTING LEVER: EARLY STYLE AND REVISED STYLE: When the Relatch Roller and the Division Setting Lever are at the high point of movement, Roller A should overlatch the Setting Lever Latch by .005. To adjust, form the Division Setting Lever.

Oil bearings. Grease Relatch Roller.

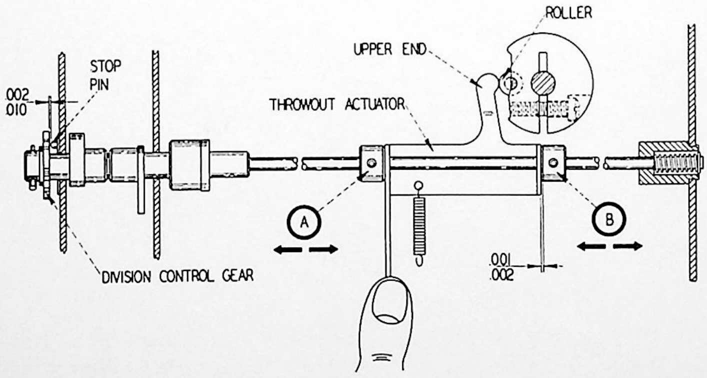


ALL MODELS

ADJ. 41B CONNECTOR ARM DIVISION THROWOUT: Have the Long Transfer Pin detented to the rear. Adjust the Clamp so there will be .001 to .002 clearance between the Connector Arm and the Division Shift Throwout Bail when the Connector Arm is swung manually into position over the Bail.

Reason for Adjustment: To swing the Upper End of the Division Shift Throwout Bail into position for contact with the Roller on the #6 Actuator when the overdraft occurs in Division. Too wide a clearance may cause a delay in actuating the Bail, therefore, the Upper End will not position in front of the Roller which will result in a failure of actuating the Division Control Gear.

Oil all bearings.



ST - S - C - D

ADJ. 41C DIVISION THROWOUT ACTUATOR: Step 1. Press on the tail of the Throwout Actuator. Release the Clutch and cycle the Drive Shaft until the Upper End and the Roller are on the high point of movement. In this position the Division Control Gear is to clear the Stop Pin by .002 to .010. Step 2. Adjust Clamp A for the clearance and adjust Clamp B for .001 - .002 right or left movement of the Throwout Actuator.

Oil all bearings.

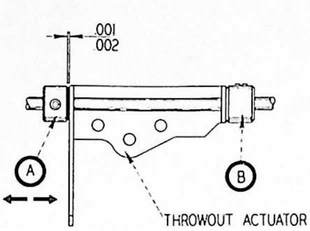


FIG 1

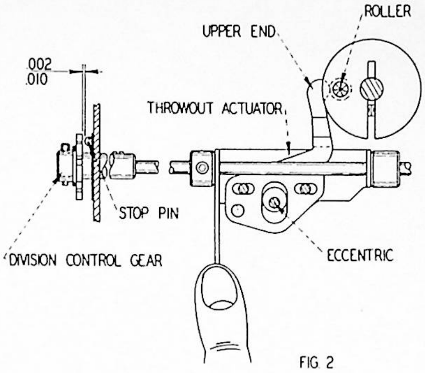


FIG 2

STW - ACG - SW - CW - DW

ADJ. 41D DIVISION THROWOUT ACTUATOR: Step 1, Fig. 1. Adjust Clamp A for .001 - .002 right and left movement of the Throwout Actuator. Clamp B is not adjustable. Step 2, Fig. 2. Press on the Tail of the Throwout Actuator. Release the Clutch and cycle the Drive Shaft until the Upper End and the Roller are on the high point of movement. In this position the Division Control Gear is to clear the Stop Pin by .002 to .010. Adjust at the Eccentric.

Oil all bearings.

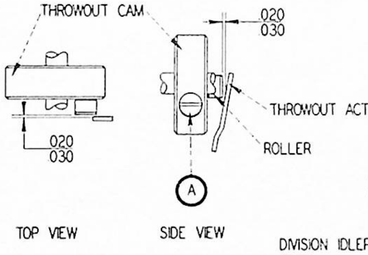


FIG 1

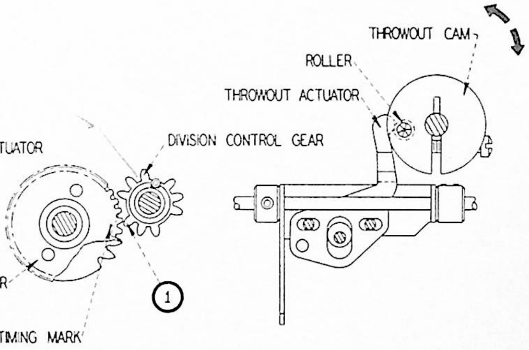


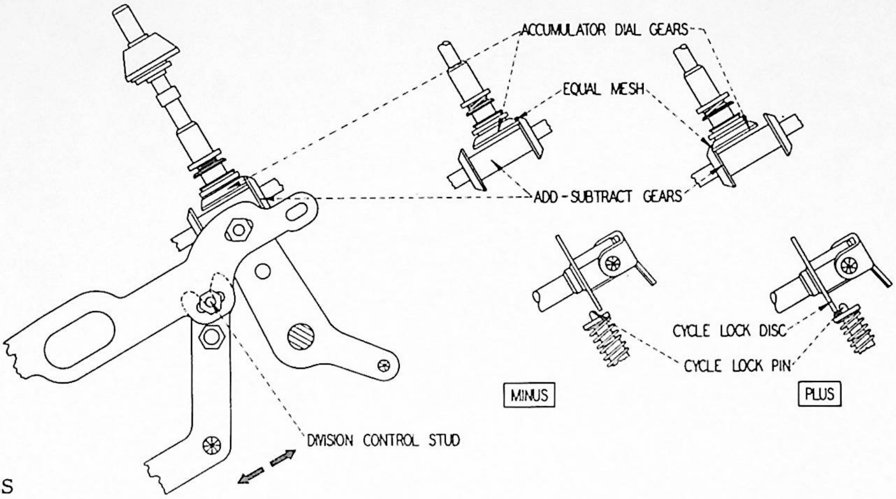
FIG 2

ALL MODELS

ADJ. 41E CAM FOR DIVISION THROWOUT - CLAMP TYPE: Step 1, Fig. 1. Loosen Screw A and slide the Throwout Cam up or down to obtain approximately .020 to .030 clearance between the Roller and the Throwout Actuator at their closest position. Step 2, Fig. 2. Depress the Division Keys and rotate the Drive Shaft by hand. Adjust the rotational position of the Throwout Cam so that the Roller contacts the Throwout Actuator and starts moving the Division Control Gear out when Tooth 1 is aligned with the Timing Mark on the Division Idler Gear.

NOTE: Later models have a permanently fastened Throwout Cam. The Throwout Actuator may be formed to obtain the clearance in Fig. 1. The time of moving out for the Division Control Gear can be controlled slightly by Adj. 41D.

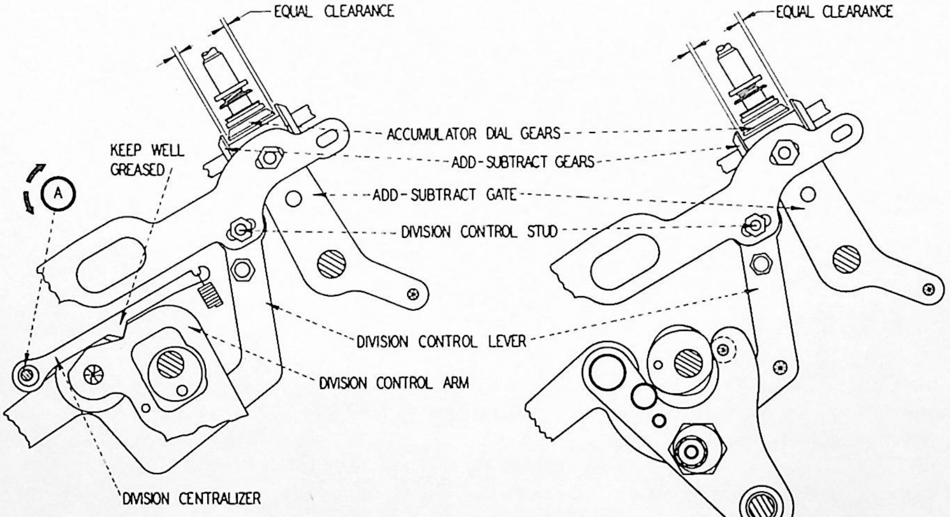
Oil the bearings.



ALL MODELS

ADJ. 42A DIVISION CONTROL STUD: Have the machine in Division. Adjust the Division Control Stud to obtain equal mesh of the Add - Subtract Gears to the Accumulator Dial Gears in Minus and Plus positions. The meshing can be observed by sighting under the Carriage from either the right or the left and observing the depth of engagement the Add - Subtract Gears have with the Dial Gears.

NOTE: The Cycle Lock Pin should clear the Cycle Lock Disc in the Plus and Minus positions. Do not adjust the Division Control Stud for this clearance. Refer to Adj. 40A.

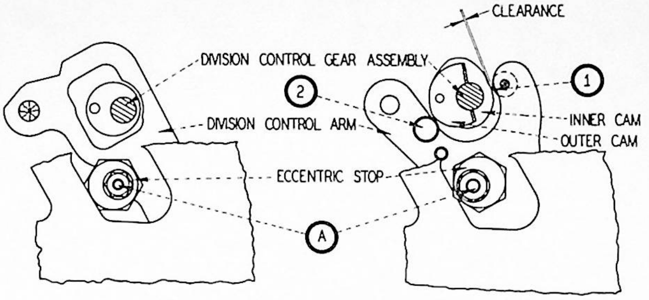


ALL MODELS FIG. 1 FIG. 2

ADJ. 42B DIVISION CENTRALIZER: Fig. 1, Early Style. Cycle the machine to the Carriage Shift position in Division. The Division Centralizer is to position the Division Control Arm so the Add - Subtract Gate is held to give equal clearance between the Add - Subtract Gears and the Accumulator Dial Gears. Adjust at Eccentric A keeping the lobe down. This centralized position can be determined by sight or by pushing to the rear on the Division Stop Lever and observing that the Add - Subtract Gate does not move when the Division Control Lever delatches from the Division Control Stud. Keep the Centralizer point well greased.

Fig. 2. Complimentary Cam Controlled Centralizer. With a correct setting per Adj. 42A, the Add - Subtract Gears should be held for equal clearance to the Accumulator Dial Gears when the machine is cycled to the Carriage Shift position. Test by sight or by pushing to the rear on the Division Stop Lever and observing that the Add - Subtract Gate does not move when the Division Control Arm delatches from the Division Control Stud. If movement is observed, adjust the Division Control Stud and recheck Adj. 42A.

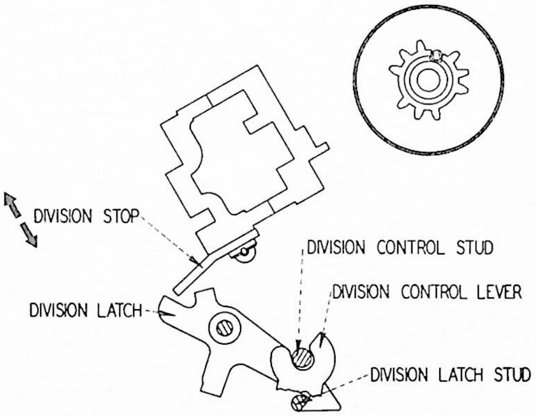
Grease the Cams.



ALL MODELS

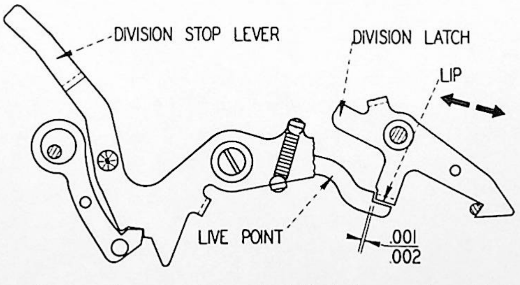
FIG. 1 FIG. 2

ADJ. 42C ECCENTRIC STOP FOR DIVISION CONTROL ARM: Fig. 1. Early style. When the machine is in Home Position, the Eccentric Stop should hold the Division Control Arm so the Division Control Gear Assembly is free to move in and out without binding. To adjust, loosen Nut A and turn the Eccentric Stop with the lobe forward and up. If the lobe of the Eccentric Stop is too far forward, a noticeable bind will be felt during hand cycling in Division. Fig. 2. Complimentary Cam Control. The preceding applies for this style except adjust for clearance between Roller 1 and the Inner Cam. If the lobe of the Eccentric Stop is too far forward a noticeable bind will be felt between the Outer Cam and Roller 2 during hand cycling.



ALL MODELS

ADJ. 42D DIVISION STOP ON CARRIAGE: When the Carriage shifts to the first position in Division and the Add - Subtract Gate moves to the Add position the Division Stop is to engage the Division Latch. This holds the Division Latch from following the Division Latch Stud, therefore, allowing the Division Control Lever to delatch from the Division Control Stud and stop the machine. If the machine makes an extra cycle or runs over, which would position the Division Control Gear in Home Position (see inset), form the Division Stop down. If the Stop is not getting behind the Division Latch form the Stop up.



ALL MODELS

ADJ. 42E DIVISION LATCH: Place the machine in Division and pull down on the Division Stop Lever. When the Division Control Lever moves to the Add position, the Live Point should latch with the division Latch Lip and have .001 to .002 clearance. Form the Latch Lip.

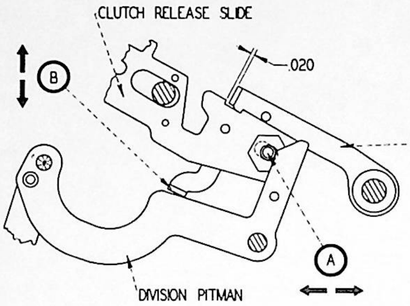


FIG. 1

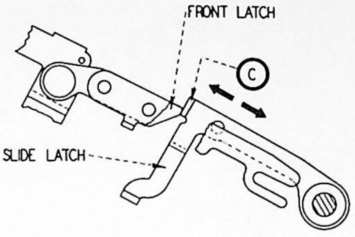
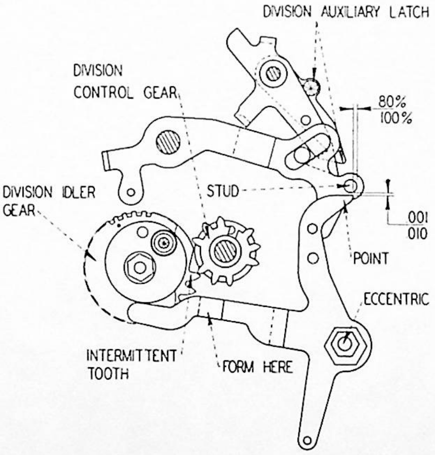


FIG. 2

STW - ACG - SW - CW - DW - SRW

ADJ. 43 CLUTCH RELEASE SLIDE LATCH: Fig. 1. When the Division mechanism is actuated, the Clutch Release Slide should overlatch the Release Slide Latch by approximately .020. Adjust Screw Stud A. When the Division Pitman is restored, the Release Slide Latch is to raise and disengage from the Clutch Release Slide. Form the Release Slide Latch at B if necessary. Fig. 2. With the Add Key down, depress the Division Keys and cycle the Drive Shaft by hand. The Front Latch should raise and engage with the Release Slide Latch. The Front Latch should not have motion when in position while the machine is dividing. Form Lip C.

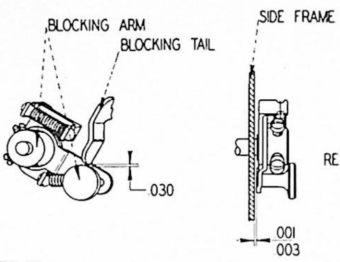
Oil bearings.



ALL MODELS

ADJ. 44 DIVISION RELEASE DELAYING ARM: Clear the Keyboard, depress the Division Keys and rotate the Drive Shaft by hand for three cycles. This will delatch the Division Auxiliary Latch and place the Add - Subtract Gate into the Subtract position. Continue to rotate the Drive Shaft until the Division Control Gear starts to move out, then stop the Drive Shaft just as the first Intermittent Tooth of the Division Idler Gear contacts the Division Control Gear. Adjust the Eccentric to the rear and down to obtain the .001 - .010 clearance between the Stud and the Delay Arm Point and for the 80% - 100% engagement of the Point to the Stud. It may sometimes be necessary to form the Delay Arm for the 80% - 100% engagement.

Oil the bearings.



ON 10 BANK MODELS

FIG. 1

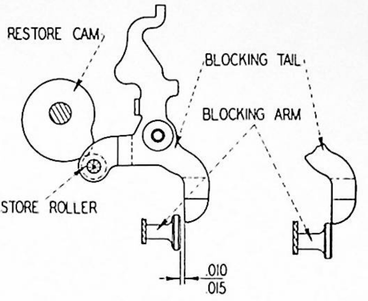


FIG. 2

ADJ. 45 EXTRA TRANSFER DIVISION BLOCKOUT: Step 1, Fig. 1. Have the machine in Home Position. Adjust the Blocking Arm to clear the Blocking Tail by .030. Also adjust the Blocking Arm for approximately .001 to .003 clearance to the Side Frame. Step 2, Fig. 2. Place the machine in Division and cycle the Drive Shaft until the Transfer Restore Cam and the Restore Roller are on the high point of movement. The Blocking Tail should have .010 to .015 clearance to the Blocking Arm. Restore the machine to Home Position and observe that the Blocking Tail limits the Blocking Arm from raising when the Division Keys are depressed. Form the Blocking Tail or twist the Blocking Arm.

Oil bearings and Restore Roller.

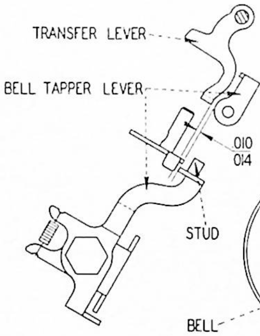


FIG. 1

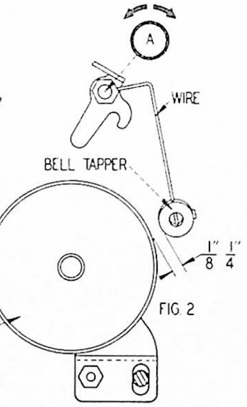


FIG. 2

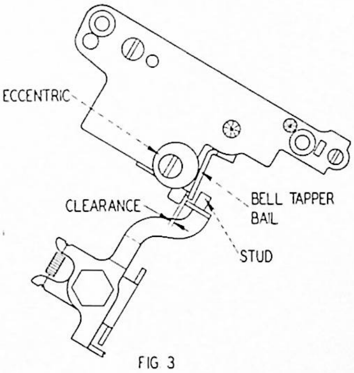


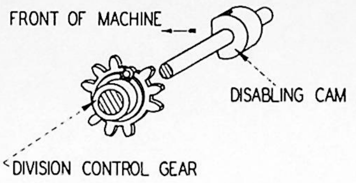
FIG. 3

STW - ACG - SW - CW - DW

ADJ. 46 BELL TAPPER: Clear the Carriage and place a Figure 1 in the first Keyboard column. Depress the Minus Key and then the Plus Key. The Bell should ring on the overdraft in all Carriage positions. The Bell should not ring during division. It should not ring on the overdraft of Minus and Plus when the Carriage is in 7th position and a 9 is in the last Accum. Dial. Step 1, Fig. 1. Form the Bell Tapper Lever to obtain .010 - .014 clearance to the Transfer Levers when the machine is in Home Position. Keep the Stud straight. Step 2, Fig. 2. As a starting point set the Bell Tapper by Screw A to clear the Bell approximately 1/8 - 1/4 inch. Test for a clear ringing of the Bell on Minus and Plus and that it does not ring in Division. The clearance can be changed by Screw A, by forming the wire, or by moving the Bell on later model machines. Step 3, Fig. 3. Place a 9 in the last Accum. Dial; place the Carriage in 7th position. If the Bell rings on a Minus or Plus overdraft, adjust the Eccentric to hold the Bell Tapper Bail away from the Transfer Lever but not against the Stud. The Bail may have motion just so the Bell does not ring.

Parts of this adjustment apply to Models ST - S - C - D.

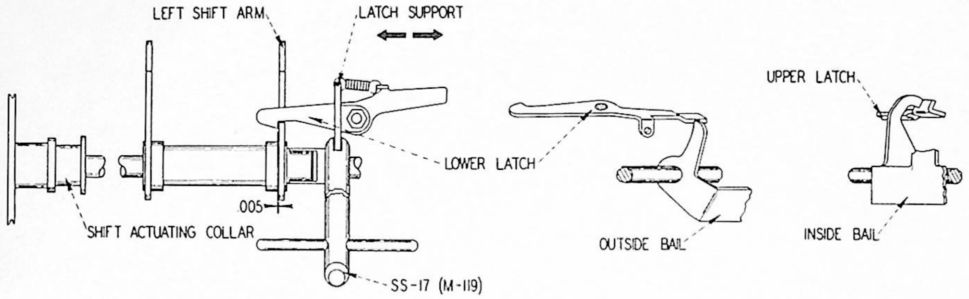
ADJUSTMENTS



STW - ACG - CW - SRW

ADJ. 47 SENSING FINGER DISABLING CAM: When the Division Control Gear is in Home Position, the flat side of the Disabling Cam should be toward the front of the machine.

Grease the Cam lightly.



STW - ACG - CW - SRW

ADJ. 48A ALIGNMENT OF LATCHES FOR DIVISION SENSING MECHANISM: Have the machine in Home Position. Form the Latch Support to obtain .005 clearance between the Lower Latch and the Left Shift Arm. When checking the clearance make sure the Shift Actuating Collar is fully positioned to the right. After forming the Latch Support check that the Outside and Inside Bails have a good contact with their Latches.

Oil the bearings lightly.

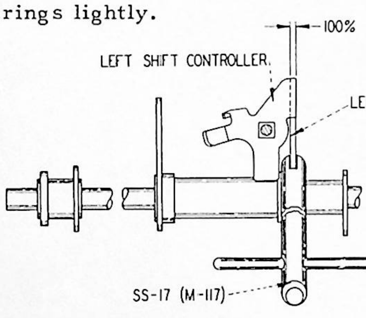


FIG. 1

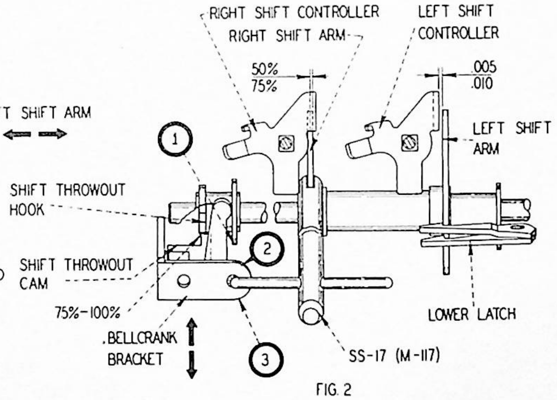


FIG. 2

STW - ACG - CW - SRW

ADJ. 48B DIVISION SHIFT ARMS - LEFT SHIFT: Step 1, Fig. 1. When the machine is in Home Position, form the Left Shift Arm for 100% engagement with the Left Shift Controller. Step 2, Fig. 2. Clear the Keyboard and the Carriage, depress the Division Keys and cycle the machine by hand until the Lower Latch is delatched. Observing from the rear continue cycling until the Left Shift Arm has moved rearward and along side of the Left Shift Controller. There should be approximately .005 - .010 clearance between the two, and the Shift Throwout Hook is to have 75% to 100% engagement on the Shift Throwout Cam. To obtain the clearance and the engagement, form the Bellcrank Bracket: Insert a screwdriver between Point 1 and 2 and form down for more clearance; for less clearance form up at Point 3. It may be necessary to readjust the Left Shift Arm. When the parts are in the same position, form the Right Shift Arm to obtain 50% - 75% engagement with the Right Shift Controller.

NOTE: Cycle the machine through several operations to check the clearances.

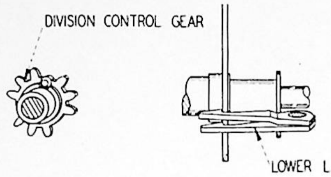


FIG 1

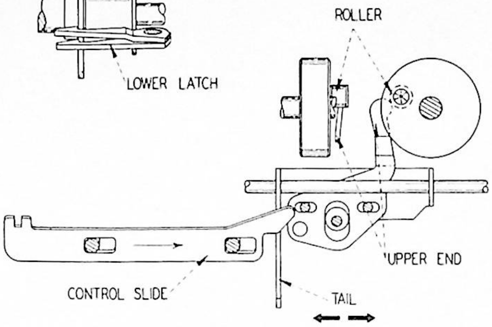


FIG 2

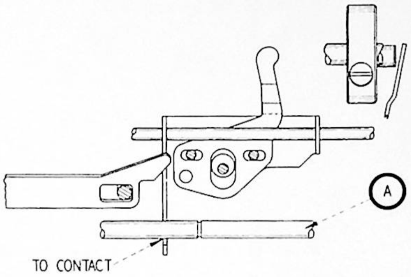


FIG 3

STW - ACG - CW - SRW

ADJ. 48C DIVISION ALIGNER CONTROL SLIDE: Fig. 1. Clear the Keyboard and the Carriage, depress the Division Keys and cycle the machine by hand until the Lower Latch is delatched and the Division Control Gear is in Home Position. Fig. 2. The Upper End of the Throwout Actuator is to have its full thickness engaged on the Roller. Form the Tail to the right or the left. Fig. 3. When the machine is in Home Position, the Control Slide should not hold the Tail from contacting Shaft A. If the Upper End does not have full engagement with the Roller recheck Adj. 48A and 41E.

Oil the bearings.

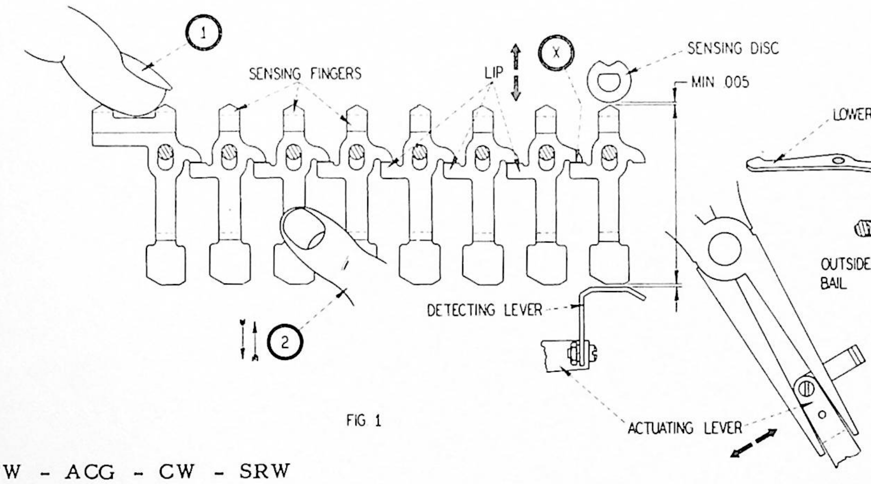


FIG 1

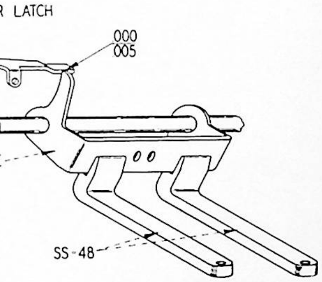


FIG. 2

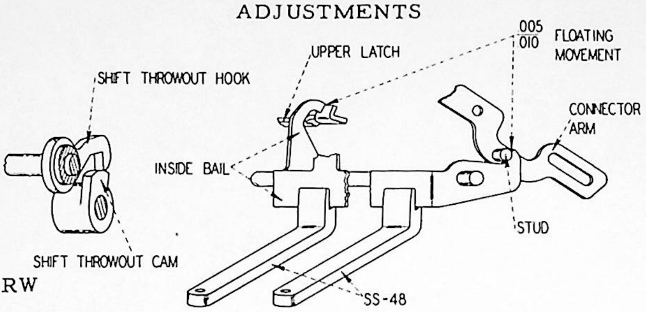
STW - ACG - CW - SRW

ADJ. 49A SENSING FINGERS; DETECTING LEVER; REVERSING BAIL: Step 1, Fig. 1. Pull the Sensing Fingers forward with Finger 1. Test all positions from left to right for minimum play by moving Finger 2 front and rear. The extreme right Sensing Finger should have minimum play at X. Form each Lip to reduce the play in that position. Step 2, Fig. 1. Turn the Accum. Dial for the Right Sensing Finger to a figure. Shift the Carriage to align the Detecting Lever with the Sensing Finger. The Detecting Lever can press against the Sensing Finger but should not push the Sensing Finger against the Sensing Disc. The Sensing Finger is to have at least .005 movement between the Sensing Disc and the Detecting Lever. Form the Actuating Lever as illustrated. Step 3, Fig. 2. Clear the Dials and turn the last Accum. Dial to a figure. Depress the Division Keys and cycle the Drive Shaft until the Shift Arms have moved to the rear and the Outside Bail is at its closest point to the Lower Latch. The Outside Bail is to clear the Lower Latch from .000 - .005. Twist the Outside Bail with Forming Tools SS-48.

Reason for Adjustment: To insure the full delatching of the Lower Latch when the Accum. Dials are at Zero. Test by cycling the machine several times in Division with nothing in the Dials.

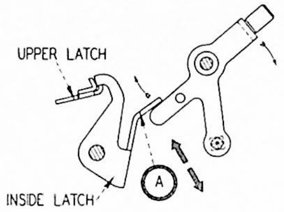
Excess oil should be kept off the Sensing Fingers.

ADJUSTMENTS



STW - ACG - CW - SRW

ADJ. 49B SHIFT REVERSING BAIL - INSIDE: Have the Keyboard and the Carriage cleared, depress the Division Keys and rotate the Drive Shaft by hand until the Shift Throwout Hook is positioned on the Shift Throwout Cam. This brings the Upper Latch close to the Inside Bail. The Inside Bail is to float between the Upper Latch and the Stud on the Connector Arm with .005 to .010 movement. Form the Bail to obtain the adjustment. Too much clearance will affect the proper delatching of the Upper Latch. No clearance may cause the Latch to be prematurely delatched.



STW - ACG - CW - SRW

ADJ. 49C DIVISION ALIGNER - OVERRIDE SHIFT REVERSING LEVER: When the Carriage is shifted to the extreme right in Division and the Carriage Shift Gear is on the high point of override, the Inside Bail should delatch the Upper Latch. Adjust at A.

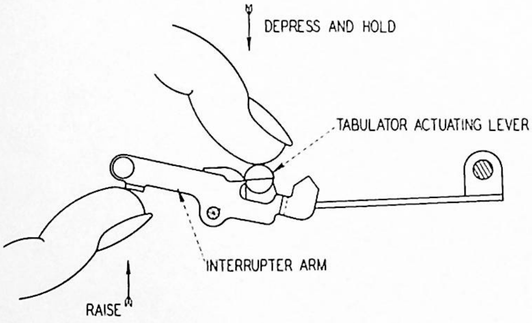


FIG.1

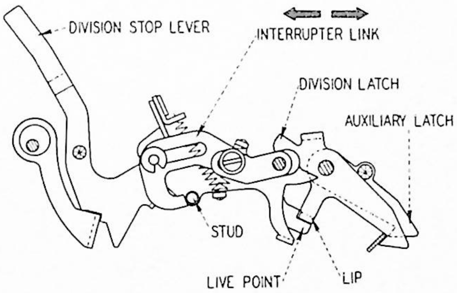


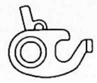
FIG 2

ACG - STW - CW

ADJ. 50 AUTOMATIC DIVISION STOP: Remove the Carriage; depress the Division Keys and cycle the Drive Shaft by hand until the Auxiliary Latch, Fig. 2, is delatched and the Add - Subtract Gate is back in minus position. Raise the Interruper Arm; depress and hold the Tabulator Actuating Lever, Fig. 1, so the Interruper Link, Fig. 2, is in line for a full engagement with the Stud on the Division Stop Lever. Turn the crank slowly to place the Add - Subtract Gate in Add Position. As the Gate is moving to its maximum travel in Add, the Interruper Link is to actuate the Division Stop Lever to the forward position. This action positions the Live Point up and in front of the Division Latch Lip. Continued cycling of the Drive Shaft will bring the Gate to the neutral position and the Division mechanism will delatch. To adjust for positioning the Division Stop Lever and the Live Point, move the Interrupter Link forward or rearward. Too much rearward adjustment will cause the Division Stop Lever to position before the Gate is in position. This will cause excessive pressure on the parts. Too much forward adjustment will not allow the Division Stop Lever to be positioned. Install the Carriage and test in Division with two Tab Stops depressed.

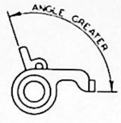
Oil any bearings.

ADJUSTMENTS



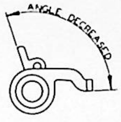
44520 EARLY

FIG 1



44520-2

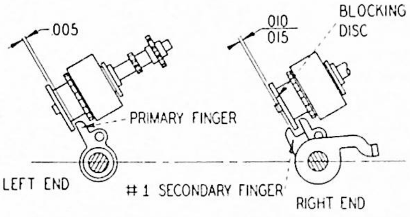
FIG 2



44620

FIG 3

#1 COUNTER TOOTH AND LOCK ASSEMBLY: This information is inserted to explain the different #1 Counter Tooth and Lock Assemblies. Fig. 1 is the type found on the Gray Line models having the aluminum front rail for the Carriage. Fig. 2 is the same except for the design, and is interchangeable with Fig. 1. Fig. 3 looks identical to Fig. 2 but isn't interchangeable because of the angle difference. This part is used on the W line models and those Gray Line having the steel front rail for the Carriage.



LOOKING FROM RIGHT SIDE OF MACHINE

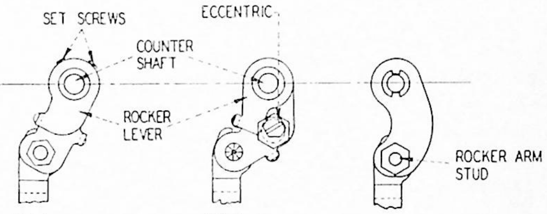


FIG 1 FIG 2 FIG 3

LOOKING FROM LEFT SIDE OF MACHINE

ALL MODELS

ADJ. 51A COUNTER ROCKER LEVER: When the machine is in Home Position and the Carriage is to the extreme left, the Number 1 Secondary Finger should clear the Blocking Disc by .010 to .015. Fig. 1 shows the early style Rocker Lever for the "W" Line models. For this style, loosen the Set Screws and rotate the Counter Shaft. Keep the left end of the Counter Shaft flush with the Rocker Lever. Fig. 2 shows the revised style Rocker Lever for the "W" Line models. This assembly is pinned to the Counter Shaft and the Eccentric is used for making the clearance. Fig. 3 shows the style used on the Gray Line models. The Rocker Lever is pinned to the shaft, therefore, the Rocker Arm Stud is moved to obtain the adjustment. The Primary Fingers on the Left end of the Counter Assembly are to clear the Blocking Disc by approximately .005. Form the Fingers.

The Secondary Fingers on the left end will have more clearance to their Blockout Discs because of the spiral of the Counter Assembly.

The Counter Fingers assemblies should be oiled lightly.

ADJUSTMENTS

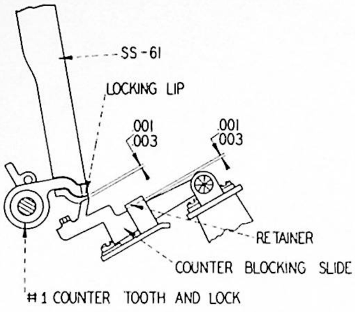


FIG. 1

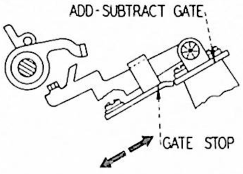


FIG. 2

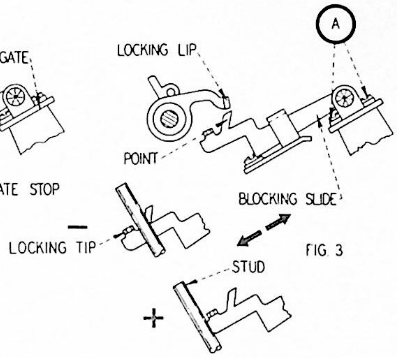
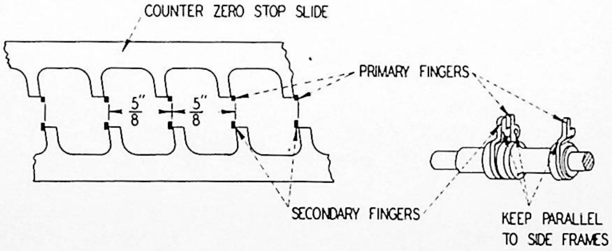


FIG. 3

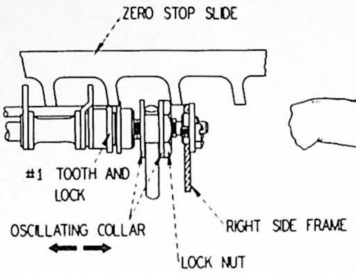
ALL MODELS

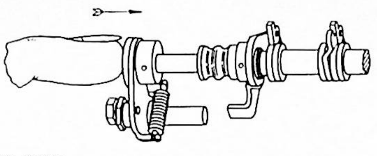
ADJ. 51B COUNTER BLOCKING SLIDE: Step 1, Fig. 1. All models. The Counter Blocking Slide should not contact the Locking Lip of the Number 1 Counter Tooth and Lock Assembly when the Add - Subtract Gate is moved from Plus to Minus. Form the Locking Lip with SS-61 for .001 - .003 clearance. Brace the Counter when adjusting. Step 2, Fig. 1. All models. Form the Retainer for .001 - .003 clearance to the Blocking Slide. Step 3, Fig. 2. All models. Depress and hold the Minus Key. Adjust the Gate Stop to touch the Add - Subtract Gate. (On early Gray Line models, the Counter Blocking Slide is adjusted against the Center Bearing Plate). Step 4, Fig. 3. All models. Adjust the Blocking Slide at Screw A to position the Point approximately in the center of the Locking Lip. In the Plus and Minus Cycles, the Locking Lip is to clear the Point when it dips down. On late "W" Line models the Locking Tip is to clear the Oscillator Arm Stud.

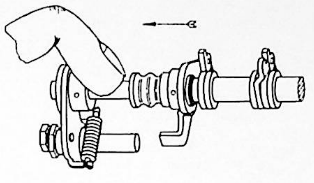


ALL MODELS

ADJ. 51C COUNTER FINGER ALIGNMENT: The Primary and Secondary Fingers are to be in line and parallel with the Side Frames. The spacing of the Fingers is 5/8" between centers. Use a Counter Zero Stop Slide as a gauge. Starting with the extreme right Fingers, align them by forming.




PUSH

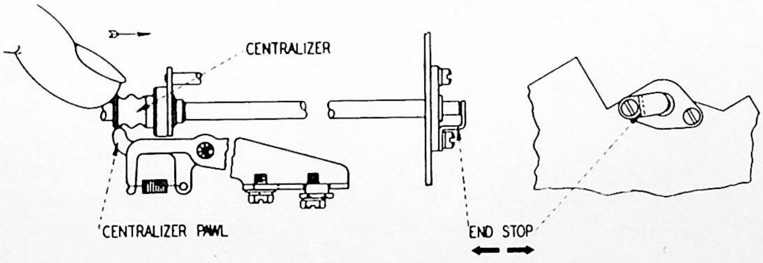

PULL

ALL MODELS

ADJ. 51D COUNTER OSCILLATING COLLAR: The Counter is adjusted for proper right and left movement by rotating the Oscillating Collar. For a preliminary positioning of the Counter before final adjusting, use a Zero Stop Slide as a gauge to position the edge of the #1 Tooth and Lock Assembly 5/8'' from the inside edge of the Right Side Frame. Adjust the Oscillating Collar to move the Counter right or left.

For final test and adjustment, the Oscillating Collar should be set to give the Counter equal throw in both Add and Subtract Cycles. To test, use a ''push-pull'' test. Shift the Carriage to the extreme left. Applying no more than one pound of pressure, push on the left end of the Counter Shaft. Depress the Minus and Plus keys in rapid succession. This transfers 9's in and out of the Counter. Repeat this test by pulling on the left end of the Counter. If the Counter Dials hesitate or fail to count or transfer this will indicate in which direction the Counter should be moved. Adjust the Oscillating Collar. The Lock Nut should be tightened each time the Oscillating Collar is moved. An additional test is to push the Counter to the extreme right, depress the Minus Key and then the Plus Key. Hold each for a few cycles. Next, push the Counter to the left and repeat the procedure. The Dial operated by the #1 Primary should not fail to rotate. Test each Dial. If a Dial fails to rotate, recheck the Oscillating Collar and the alignment of the Primary finger. Because it is sometimes difficult to push or pull on the Counter, an additional check is the ''push-pull'' test of the Carriage. Push the Carriage from Right to Left and depress the Plus and Minus Keys in rapid succession. If the Counter should fail when the Carriage is held to the left, move the Counter to the left. If the Counter should fail when the Carriage is pushed to the Right, move the Counter to the Right.

NOTE: Whenever the Counter is moved, it is always necessary to readjust the Counter Centralizer.



STW - ACG - SW - CW - DW - SRW

ADJ. 51E COUNTER END STOP: The End Stop is to be adjusted by forming to prevent the Centralizer Pawl from catching on the left edge of the Centralizer when the Counter is pushed to the right. When the finger is released, the Counter should move to the left.

Oil the Counter Shaft at the bearings.

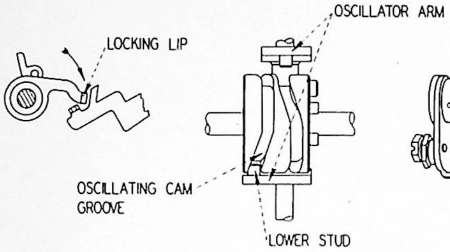


FIG. 1

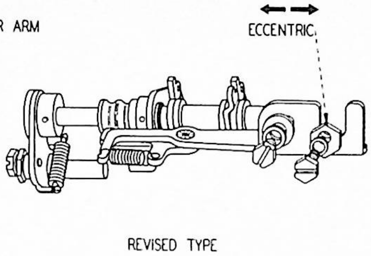


FIG 2

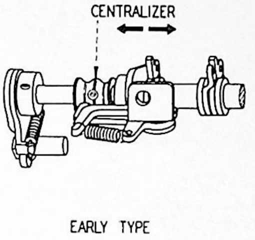
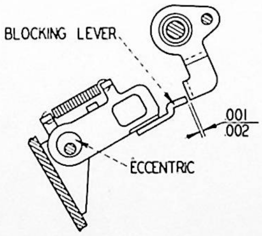


FIG. 3

STW - ACG - SW - CW - DW - SRW

ADJ. 51F COUNTER CENTRALIZER: Fig. 1. Depress the Plus Key and rotate the Drive Shaft by hand until the Locking Lip stops in its downward motion. This positions the Lower Stud on the Oscillator Arm at the narrow part of the Oscillating Cam Groove. Fig. 2. Adjust the revised type Centralizer by the Eccentric, and the early type, Fig. 3, by moving the Centralizer to obtain equal movement to the left and right from the center position. To test, push and pull lightly on the counter.

Keep the Centralizer well greased.



STW - ACG - CW - SRW

ADJ. 51G COUNTER BLOCKOUT BLOCKING LEVER (MULTIPLIER NON-ENTRY): When the Multiplier Non-Entry Lever is pulled to the front of the machine for bringing the Blocking Lever into Blocking position, adjust the Eccentric to obtain .001 to .002 clearance as illustrated.

Oil the bearing.

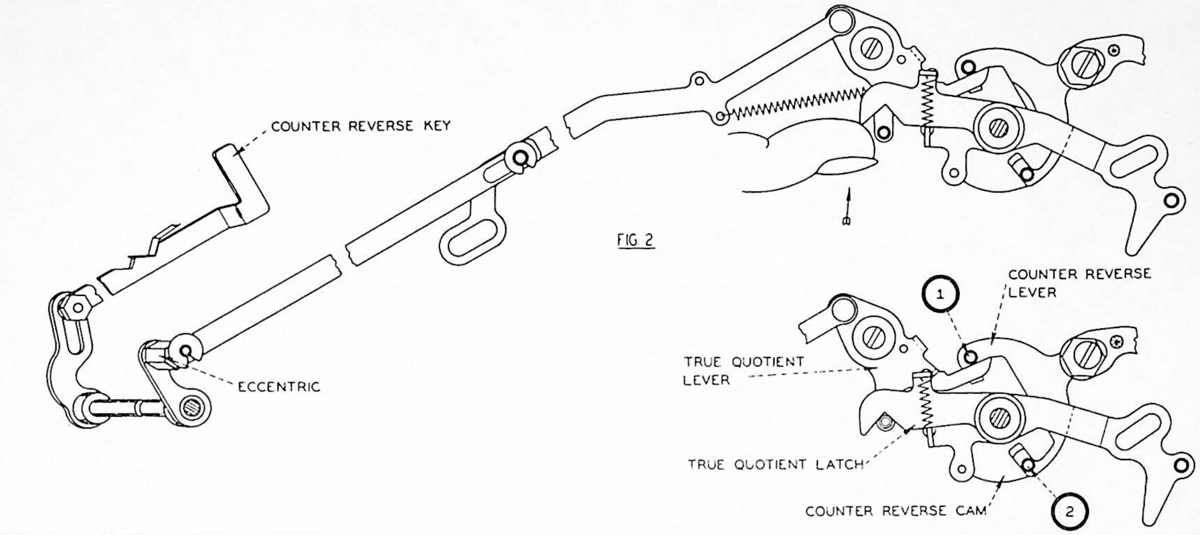
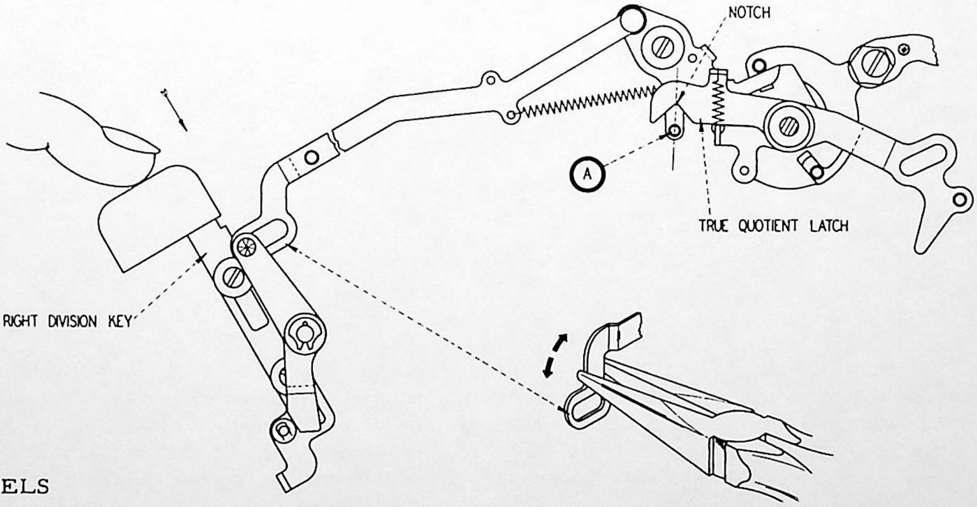


FIG 2

FIG 1

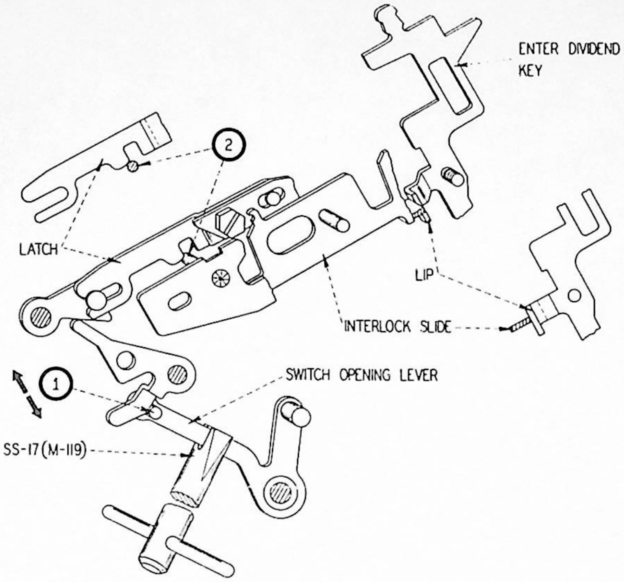
STW - ACG - CW - SRW

ADJ. 51H COUNTER REVERSE KEY: Depress both Divide Keys and cycle the Drive Shaft by hand for 3 cycles. This places the Add - Subtract Gate back into Subtract position. The True Quotient Latch, Fig. 1, is holding the True Quotient Lever; this holds the Upper Stud #1 of the Counter Reverse Lever above the Counter Reverse Cam and holds the Lower Stud #2 into the Cam. This gives the position for adjusting the Counter Reverse Key. Pull the Counter Reverse Key forward, raise the True Quotient Latch, Fig. 2. Adjust the Eccentric so the True Quotient Lever is held in the same position as when held by the True Quotient Latch.



ALL MODELS

ADJ. 51J TRUE QUOTIENT LEVER: Stud A is to position in the center of the Notch of the True Quotient Latch when the Right Division Key is held depressed. Form as illustrated.



STW - ACG - SW - CW - DW - SRW

ADJ. 52 SWITCH OPENING LEVER: Twist the Switch Opening Lever to lower Stud 1 so that, as the Enter Dividend Key is slowly depressed, the Interlock Slide will move rearward and lightly contact the Lip on the Enter Dividend Key. As this contact is made the Latch should just clear Stud 2 without causing a noticeable drag on the Enter Dividend Key.

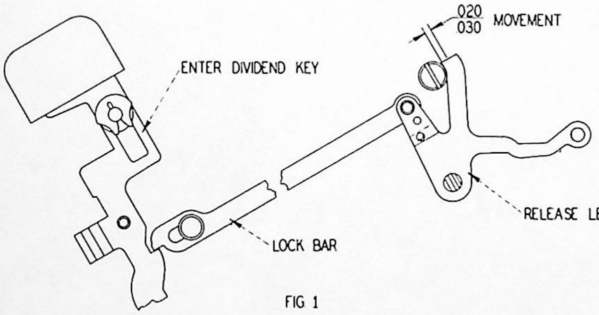


FIG 1

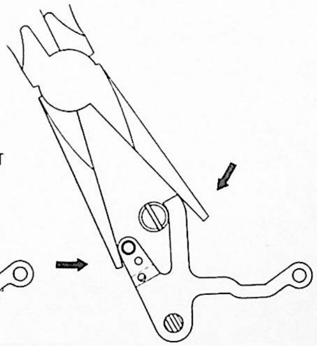


FIG. 2

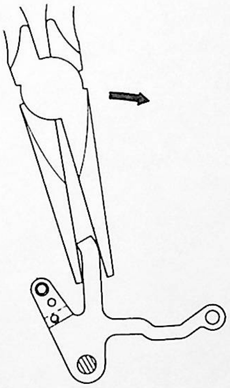
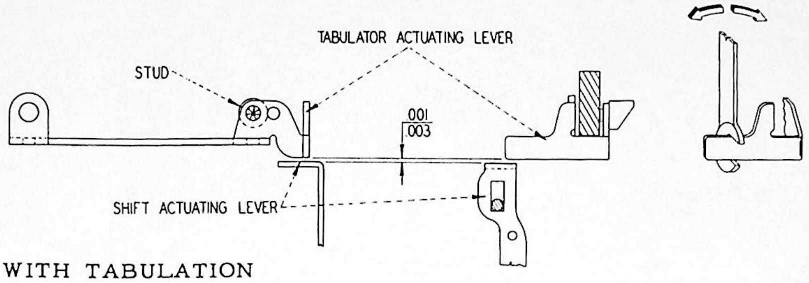


FIG. 3

ALL MODELS

ADJ. 53A TABULATOR KEY LATCHING: Fig. 1. The Lock Bar should engage sufficiently with the Enter Dividend Key to prevent premature restoring during operation. Since the area of engagement cannot be seen, the amount of bite can be determined by observing the movement of the Release Lever when the Enter Dividend Key is depressed. This movement may be .020 to .030. The adjustment of this part is not usually necessary, however, the sufficient bite can be obtained by forming the Release Lever. Fig. 2. Squeeze to reduce the bite. Fig. 3. Form to the rear to increase the bite.



ALL MODELS WITH TABULATION

ADJ. 53B TABULATOR ACTUATING LEVER: The Tabulator Actuating Lever should clear the Shift Actuating Lever by .001 to .003 when raised. The clearance may be obtained by forming as illustrated. This close clearance is to keep the Stud up in position for proper contact with the Tab Key in the Carriage. If the clearance is too wide, the Stud will be too low which would result in a slow action of the Shift Actuating Lever for tripping the Add - Subtract Gate.

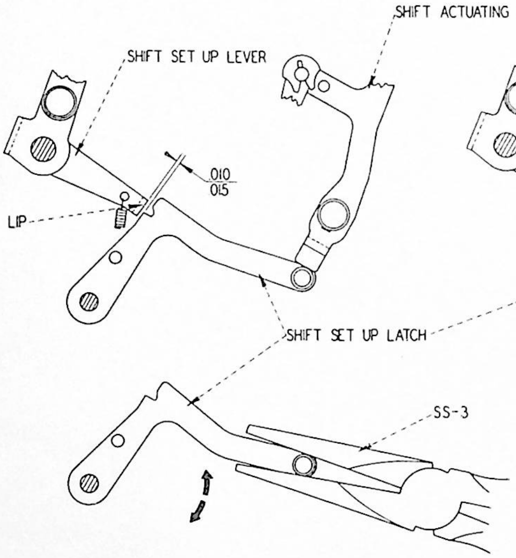


FIG. 1

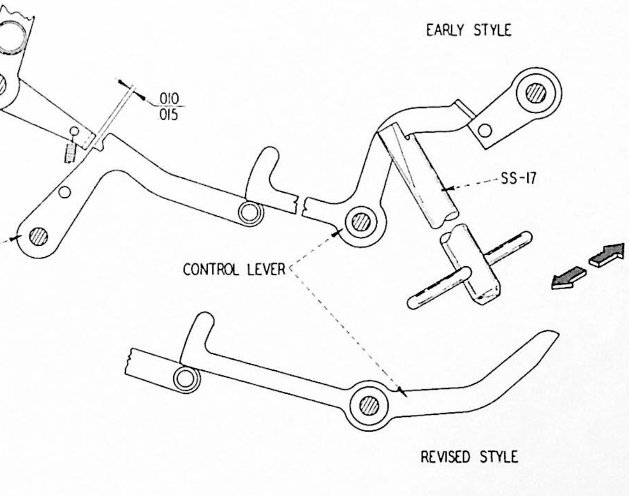
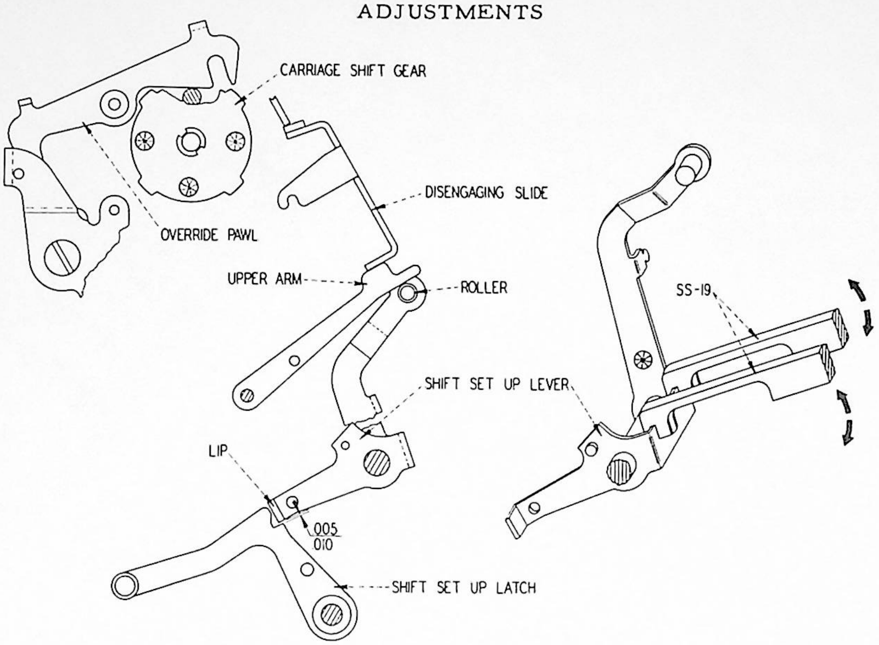


FIG. 2

ALL MODELS WITH TABULATION

ADJ. 53C SHIFT SET UP LATCH: When the machine is in Home Position, the Shift Set Up Latch is to clear the Shift Set Up Lever Lip by .010 - .015. When a Tab Stop is latched down, the Shift Actuating Lever should not cause the clearance to increase. On machines having the Early Style Control Lever the adjustment can be made by twisting the Control Lever, Fig. 2. On machines having the Revised Style Control Lever, the adjustment is best made by forming the Shift Set Up Latch, Fig. 1.

Reason for Adjustment: The clearance is to insure proper delatching and that the Actuating Lever does not delatch the Shift Set Up Latch before the Trip Lever, Adj. 53E, has actuated the Delatching Lever.



ALL MODELS WITH TABULATION

ADJ. 53D SHIFT SET UP LEVER: Latch the Enter Dividend Key and cycle the Drive Shaft until the Carriage Shift Gear has actuated the Override Pawl for maximum movement. The lip of the Shift Set Up Lever should overlatch the Shift Set Up Latch by .005 - .010. Form the Shift Set Up Lever with two SS-19 Forming Tools. After adjusting, check that the Upper Arm will slide freely between the Disengaging Slide and the Roller when in Home Position.

Oil any bearing. Keep excess oil off the Shift Set Up Latch.

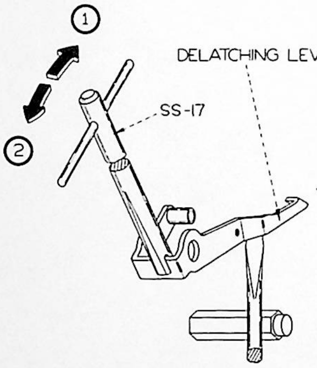


FIG. 1

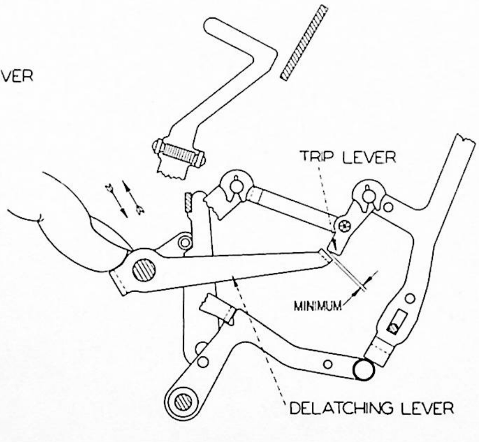


FIG. 2 (RIGHT SHIFT)

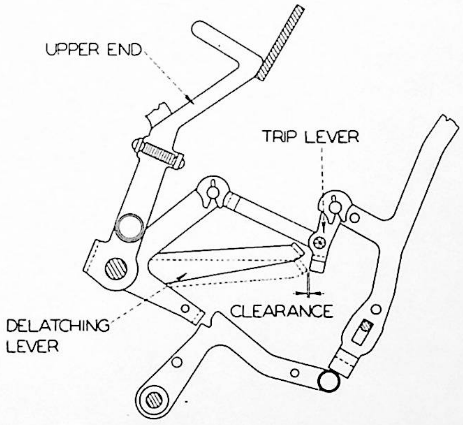


FIG. 3

ALL MODELS WITH TABULATION

ADJ. 53E DELATCHING LEVER: When the Carriage is shifting to the right in Dividend Tabulation, there should be a minimum of clearance between the Delatching Lever and the Trip Lever. The clearance can be tested by pressing on the Delatching Lever as shown in Fig. 2. To reduce the clearance, place a Screwdriver, Fig. 1, under the long arm of the Delatching Lever and move SS-17 in the direction of Arrow 1. To increase the clearance, place a Screwdriver on top of the long arm and move SS-17 in the direction of Arrow 2. Test for binds after forming. When the machine is in Home Position and no Tab Stops are depressed, the Delatching Lever should clear the Trip Lever if the Delatching Lever is swung up and down, Fig. 3. Only if the parts contact, form the Upper End to the rear.

Oil all bearings.

ADJUSTMENTS

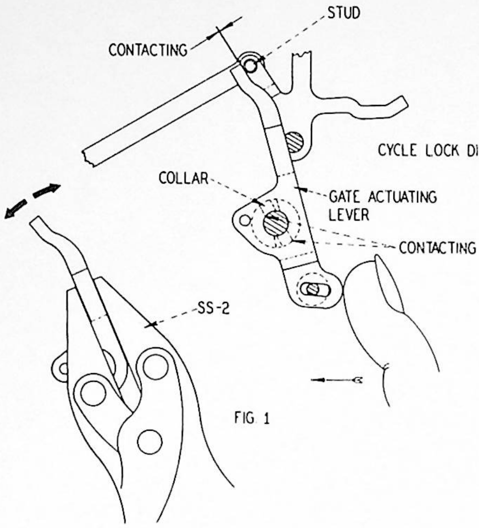


FIG 1

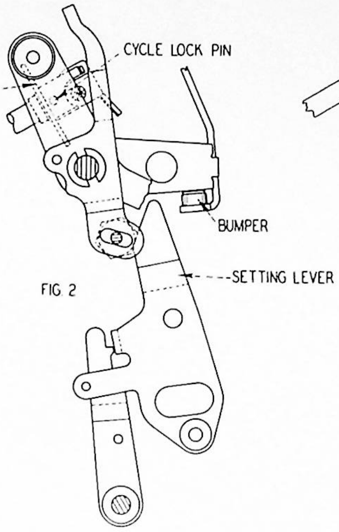


FIG 2

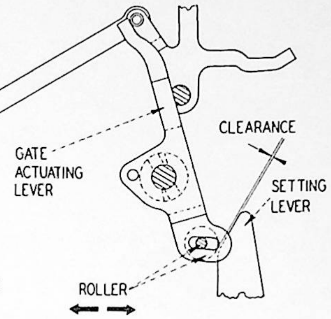
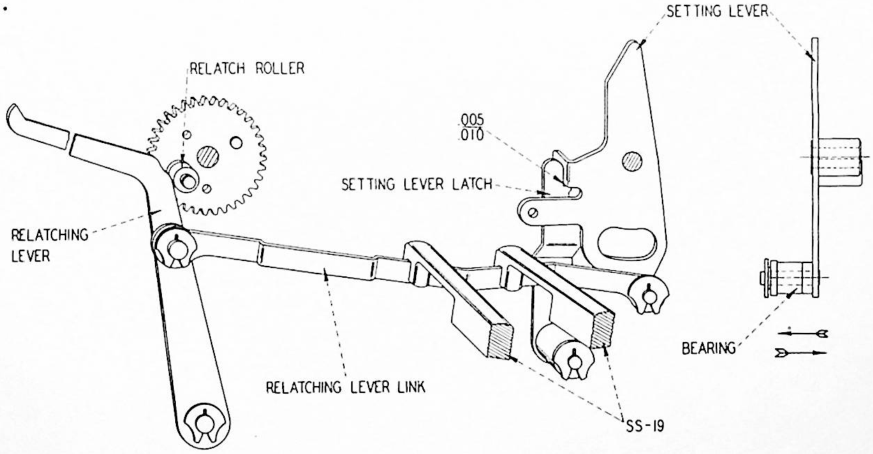


FIG 2

ALL MODELS WITH TABULATION

ADJ. 53F GATE ACTUATING LEVER: Step 1, Fig. 1. The Gate Actuating Lever should contact the Stud when held in contact with the Collar on the Gate Shaft. Form the Gate Actuating Lever. Step 2, Fig. 2. The Add - Subtract Gate is to be fully positioned when the Setting Lever is tripped. Without the hand crank in the machine, manually trip the Setting Lever. The Add - Subtract Gate should be limited in its movement by the Bumper and the Cycle Lock Pin should be to the rear of the Cycle Lock Disc. Adjust the Roller to control the Gate movement. When the Gate is restored, depress and hold the Minus Key. There is to be clearance between the Roller and the Setting Lever to insure the Minus Key does not stick down. This clearance can vary. The important item is that the Gate is positioned and that the Minus Key does not stick because of the Roller.

Oil all bearings.

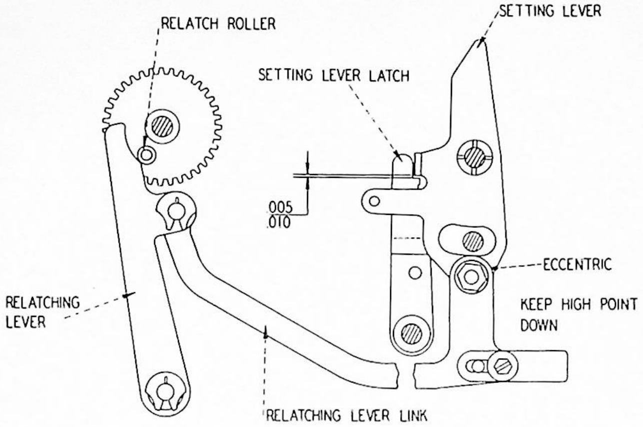


ALL MODELS WITH TABULATION

ADJ. 53G RELATCHING LEVER LINK - EARLY STYLE: Rotate the Drive Shaft until the Relatch Roller is on the high point of movement with the Relatching Lever. The Setting Lever should overlatch the Setting Lever Latch by .005 - .010. Shorten or lengthen the Relatching Lever Link at the offsets by using two SS-19 Forming Tools. After forming, test that the Bearing is free on the stud of the Setting Lever.

Reason for Adjustment: The overlatch insures proper restoring and safe latching of the Setting Lever after the Add - Subtract Gate has been actuated in Enter Dividend. Failure to latch would cause the Add Subtract Gate to be held in Add position. A tight Bearing can restrict the movement of the Setting Lever and give an improper Dividend Entry.

Oil the bearings.

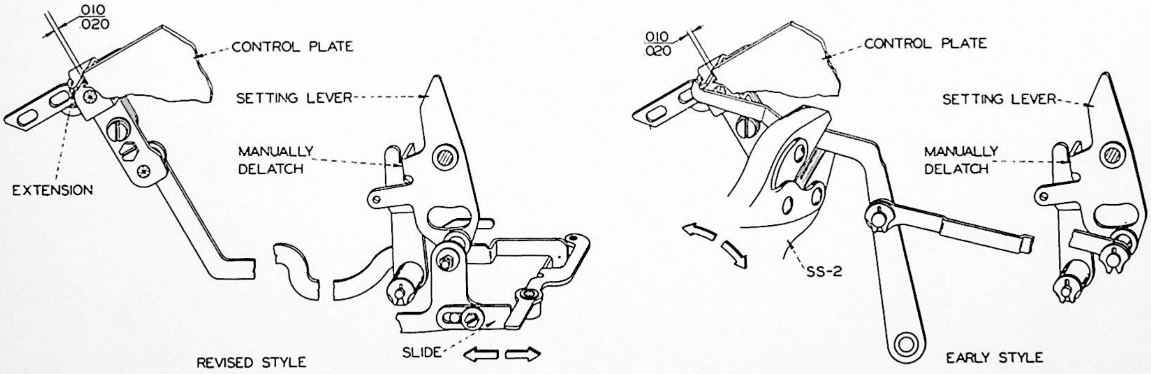


ALL MODELS WITH TABULATION

ADJ. 53H RELATCHING LEVER LINK - REVISED STYLE: Rotate the Drive Shaft until the Relatch Roller is on the high point of movement with the Relatching Lever. The Setting Lever should overlatch the Setting Lever Latch by .005 to .010. Adjust the Clearance at the Eccentric, keeping the high point of the Eccentric down.

Reason for Adjustment: The overlatch insures proper restoring and safe latching of the Setting Lever after the Add - Subtract Gate has been actuated in Enter Dividend. Failure to latch would cause the Add - Subtract Gate to be held in Add position. A tight Bearing can restrict the movement of the Setting Lever and give an improper Dividend Entry.

Oil the bearings.



ALL MODELS WITH TABULATION

ADJ. 53J CLUTCH RELEASE BOOSTER: Revised Style. When the machine is in Home Position and the Keyboard Lock Lever is up, manually delatch the Setting Lever so the Add - Subtract Gate is fully positioned. Adjust the Slide to obtain approximately .010 - .020 clearance between the Extension and the Control Plate. Early Style. Position the parts in the same manner but form the Relatching Lever to obtain the clearance.

Reason for Adjustment: To insure that the Clutch will remain open for the entry cycle of the Dividend and that the full travel of the Setting Lever is not restricted.

ADJUSTMENTS

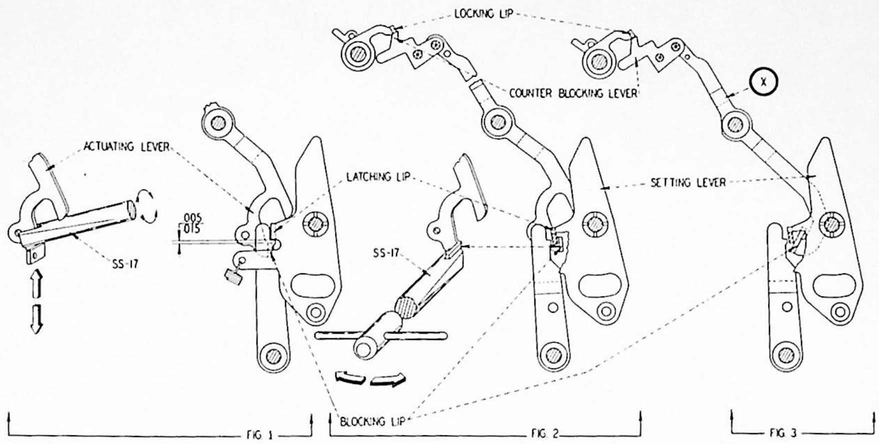


FIG 1 FIG 2 FIG 3

ALL MODELS WITH TABULATION

ADJ. 53K COUNTER BLOCKING ACTUATING LEVER: Early style. Step 1, Fig. 1. The Blocking Lip is to clear the Latching Lip by .005 - .015 at the closest point when the Enter Dividend Key is depressed. Form the Actuating Lever with SS-17. Step 2, Fig. 2. Depress the Enter Dividend Key and manually delatch the Setting Lever. The Latching Lip is to drop in front of the Blocking Lip, and in this position the Counter Blocking Lever is to be positioned approximately in the center of the Locking Lip. Form the Blocking Lip. Revised Style Fig. 3. Have the Enter Dividend Key in Home Position and manually delatch the Setting Lever; the Counter Blocking Lever is to be positioned approximately in the center of the Locking Lip. Form the Blocking Lip per Fig. 2. Sometimes it is necessary to form at X.

Reason for Adjustment: To obtain the proper positioning of the Counter Blocking Lever so the Counter is blocked from operating during the Dividend entry.

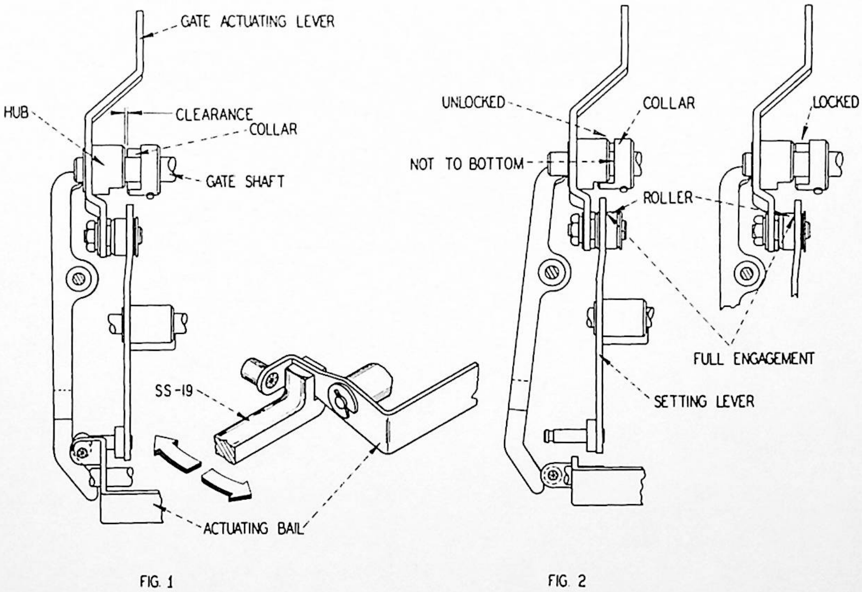
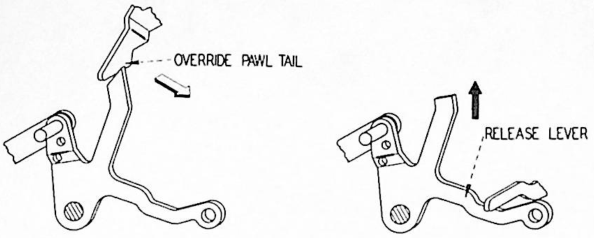


FIG. 1 FIG. 2

ALL MODELS WITH TABULATION

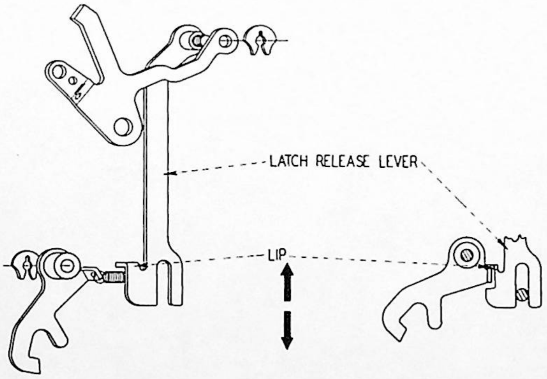
ADJ. 53L PLUS AND MINUS GATE CONTROL LEVER: When the Keyboard is locked, the Hub of the Gate Actuating Lever is to clear the Collar on the Gate Shaft, Fig. 1. When the Keyboard is unlocked, the Hub is to have a good engagement with the Collar but not to bottom, Fig. 2. Form the Actuating Bail per Fig. 1. Check to see that the Setting Lever has full engagement with the Roller in the locked and unlocked positions.

Oil the bearings.



ALL MODELS WITH TABULATION

ADJ. 53M TABULATOR KEY RELEASE LEVER: With none of the Tab stops on the Carriage Rail depressed, the Enter Dividend Key is to restore on the first override cycle when the Carriage reaches the extreme right position. If the Key fails to release, form the tail of the Override Pawl to the rear for Two Point Shift. For the Four Point Shift form the Release Lever upward.



STW - ACG - CW - SRW

ADJ. 53N LATCH RELEASE LEVER: There is to be only one entry cycle when the Enter Dividend Key is held down. Form the Lip of the Latch Release Lever.

4-25-60	Destroy Page 77 No Revision Insert This Page	Revision 1

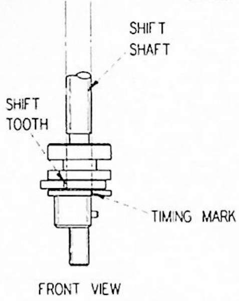


FIG 1

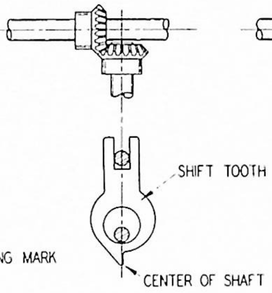


FIG 2

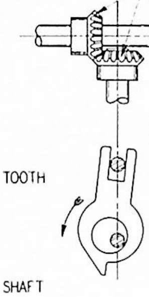


FIG 3

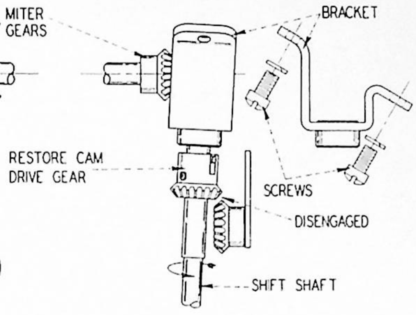


FIG 4

ST - S - STW - ACG - SW - SRW

ADJ. 54A TIMING OF MULTIPLIER UNIT SHIFT TOOTH: When the Drive Shaft is in Home Position the Shift Tooth is to be in approximate alignment with the left side of the Shift Shaft and the Timing Mark approximately in alignment with the right side of the Shaft, Fig. 1. To check the timing, release the Clutch and cycle the Drive Shaft by hand until the Shift Tooth has moved to the rear and is in the center of the shaft, Fig. 2. Continue to rotate the Drive and observe that the Drive Shaft turns two teeth before reaching Home Position. This places the timing of the Shift Tooth two tooth spaces in the direction of the rotation from Home Position, Fig. 3.

Fig. 4. To time, when installing a Shift Shaft Assembly, have the Restore Cam Drive Gear loose and the Screws out of the Bracket. Have the Drive Shaft in Home Position, move the Shift Shaft to the right to disengage the Miter Gears and rotate the Shift Shaft until the Timing Mark and Shift Tooth are positioned as in Fig. 1. Engage the Miter Gears and install the top Bracket Screw. Recheck the timing. If in time, install the bottom Bracket Screw.

Oil the bearings. Grease the gears.

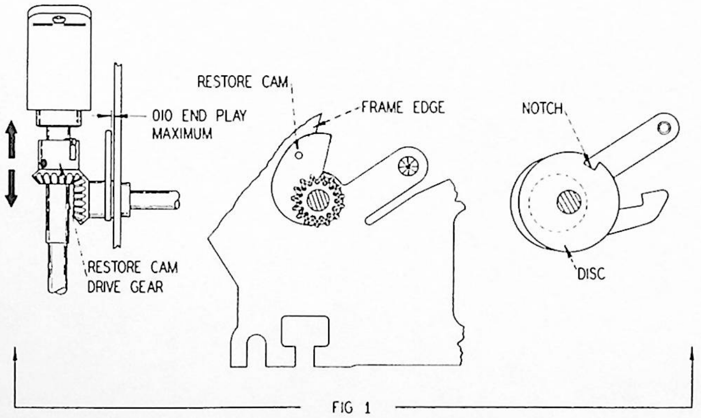


FIG 1

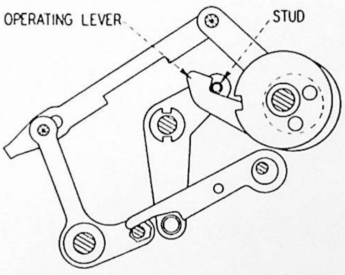


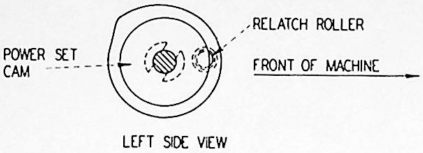
FIG 2

STW - ACG - SW - CW - DW

ADJ. 54B, REV. 1 - SHIFT SETTING AND DIAL RESET SHAFT ASSEMBLY: Fig. 1. Have the Drive Shaft in Home Position and the Restore Cam Drive Gear Disengaged. Position the Restore Cam so the Frame Edge is half way between the hole and the cam edge. The Notch in the Disc is to be approximately in position as shown. Engage the Restore Cam Drive Gear and set it for .010 end play of the assembly.

Reason for Adjustment: The rotational setting is to prevent the positioning of the Oscillating Lever on the Stud during a slow release of the Carriage Clear Key, Fig. 2. Excessive end play will cause a jam between the Restore Cam and the part it operates.

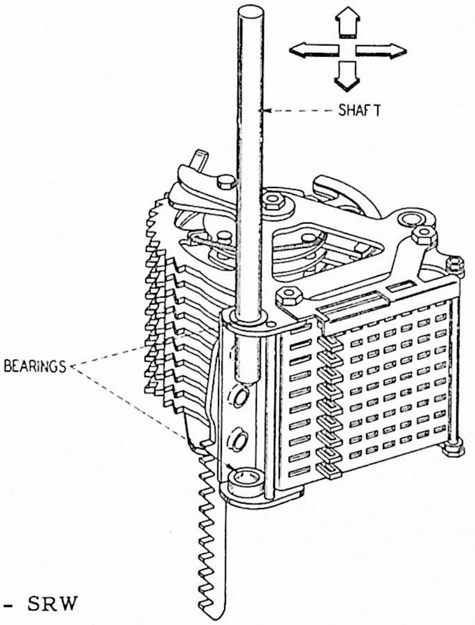
Oil the bearings.



ST - S - STW - ACG - SW - SRW

ADJ. 55 POWER SET CAM TIMING: The Relatch Roller is to be toward the front of the machine when the machine is in Home Position.

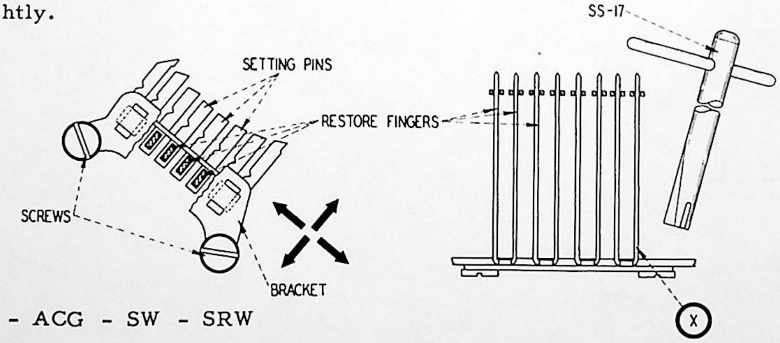
Keep excess oil off the Power Set Cam and the Drive Shaft.



ST - S - STW - ACG - SW - SRW

ADJ. 56A UNIT BEARING ALIGNMENT: Before installing the Multiplier Unit always check the alignment of the Bearings. If the Bearings are not in line with the Shaft, the movement of the Unit will be sluggish. The Bearings are in alignment when the Shaft will drop through them without binding. Hold the Unit in one hand and test the Shaft freeness in the Bearings. If the Shaft does not fit freely, insert the Shaft part way into one Bearing and force the Shaft in the direction necessary to bring the Bearing into alignment. Try the Shaft from both sides of the Unit.

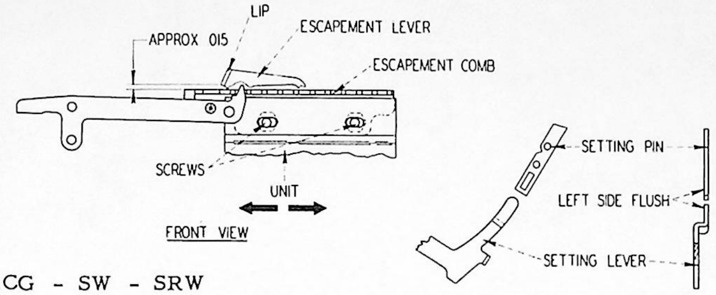
Oil the Shaft lightly.



ST - S - STW - ACG - SW - SRW

ADJ. 56B RESTORE FINGERS: The Restore Fingers should go through the holes in the Setting Pins with little or no rubbing as the Unit is moved from left to right and back. To get this movement of the Unit, hold down the Escapement Pawl and move the Unit manually. Adjust by loosening the Screws enough to allow movement of the Bracket. Tap on the Bracket with a suitable tool to move it. Each Restore Finger can be formed at X for individual alignment.

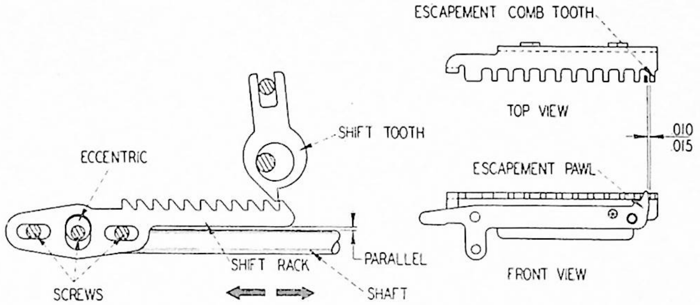
ADJUSTMENTS



ST - S - STW - ACG - SW - SRW

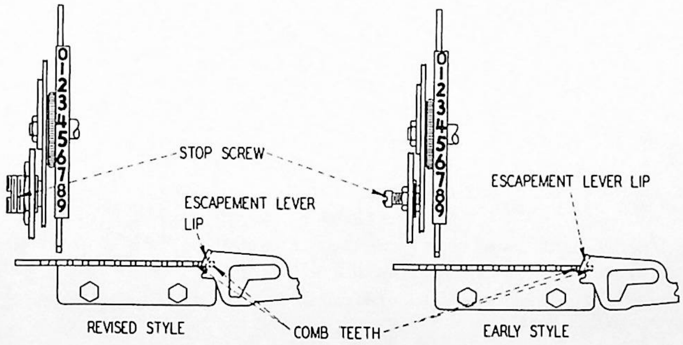
ADJ. 57A ESCAPEMENT COMB: Place the Multiplier Unit in Home Position; loosen the Screws and move the Unit to the right or the left until the left side of the 1st row of Setting Pins are flush with the left side of the Setting Levers. The Escapement Comb is to be kept level with approximately .015 clearance between it and the Lip of the Escapement Lever.

Oil the Comb Teeth lightly.



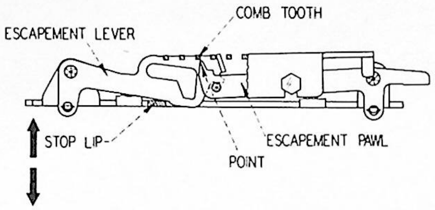
ST - S - STW - ACG - SW - SRW

ADJ. 57B MULTIPLIER UNIT SHIFT RACK: Escape the Unit to the left by depressing the Zero Key; depress the Multiplier Correction Key and cycle the machine by hand. There is to be .010 - .015 overtravel between each Escapement Comb Tooth and the Escapement Pawl before the Shift Tooth disengages from the Shift Rack. To obtain the overtravel, loosen the Three Screws and move the Shift Rack. After tightening the two outer screws, turn the Eccentric to the left for preventing slippage of the Rack. Keep the Shift Rack parallel to the Unit Shaft.



ST - S - STW - ACG - SW - SRW

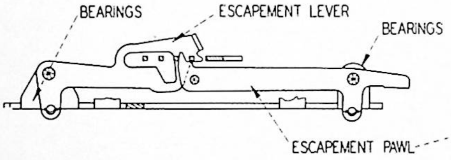
ADJ. 57C LAST POSITION UNIT STOP: When the Unit is escaped to the extreme left, the Escapement Lever Lip is to move up and down without contacting the Comb Teeth or without Sticking down. Move the Unit by adjusting the Stop Screw.



ST - S - STW - ACG - SW - SRW

ADJ. 57D ESCAPEMENT LEVER STOP: The Stop Lip is to stop the downward travel of the Escapement Lever just as the Point of the Escapement Pawl releases from the Comb Tooth. Test in each position by depressing the Zero Key. Raise or lower the Stop Lip.

Reason for Adjustment: To limit the downward travel of the Escapement Lever and to prevent it from sticking down. This adjustment will also indicate if the Comb is level by the amount of downward movement the Escapement Lever has in each tooth position after the Escapement Pawl has released the Comb.



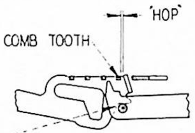


FIG 1

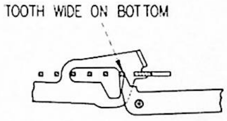


FIG 2

ST - S - STW - ACG - SW - SRW

ADJ. 57E ESCAPEMENT PAWL AND LEVER POSITIONS: (This is not a standard adjustment but a brief explanation of the escapement action and what might be the cause of a failure to escape). The Escapement Pawl and the Escapement Lever are positioned by their bearings so there will be a distinctive 'hop' of the Unit when the Escapement Pawl goes below the Comb Tooth, Fig. 1. This 'hop' places the Comb Tooth over the Escapement Pawl so it cannot return into the same tooth space. Should a lock up occur of the Escapement Lever being caught in the Comb as the Unit shifts to the right, the bearing position will change and the 'hop' can be destroyed. (The bearing can be repositioned by tapping it to the left.) The Comb on the Gray Line machines Fig. 2 and some of the early "W" Line machines had a wide bottom surface on the first tooth. This was to prevent the positioning of the Escapement Pawl into the 1st tooth space when the Unit restored to the extreme right. A changing of the bearing position would definitely effect the 'hop' from the first position.

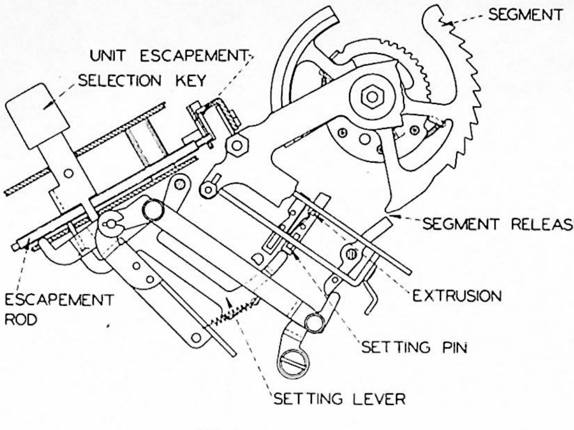


FIG 1

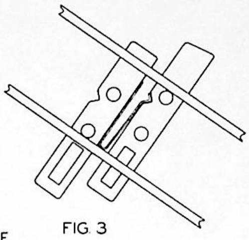


FIG 3

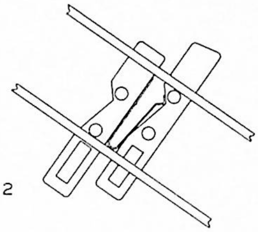
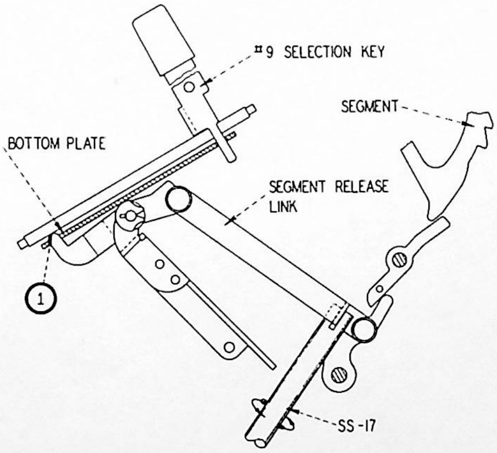


FIG 2

ST - S - STW - ACG - SW - SRW

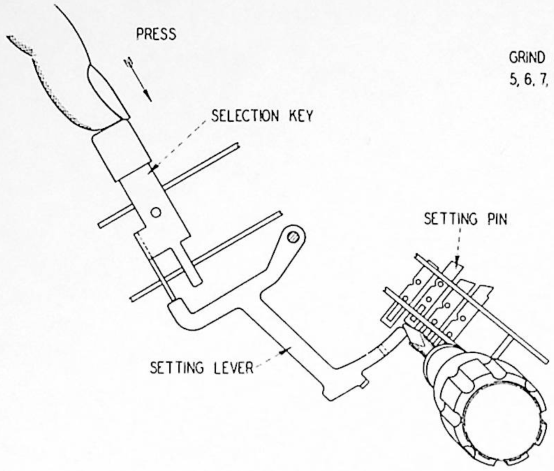
ADJ. 57F SELECTION AND ESCAPEMENT: Fig. 1. The ideal selection action consists of: 1st - the Setting Pin detenting into place; 2nd - the Segment releasing; 3rd - the Unit Escaping. The Setting Pin detent on later models has been revised to allow a faster Pin setting, Fig. 2. The Setting Pin detent prior to this change is illustrated in Fig. 3. On machines having the revised Setting Pin, it is possible to obtain a distinctive delay between each action.

To obtain a good selection and escapement action, the parts involved are to meet certain requirements: The Setting Pin is to detent (its travel is limited by the extrusion). The Escapement Rod is either to be level with the Bottom Plate or tipped slightly down at the rear. If the Rod is up at the rear, the Unit Escapement may not occur. The ideal alignment is level but sometimes a long setting lever necessitates the forming of the Rod. The Setting Levers should not be 'long' or 'short'. A 'long' Setting Lever, which restricts the depression of the Key and causes an escapement failure, usually exists when new parts are installed. A 'short' Setting Lever is found on a machine that has been in use. The 'short' Setting Lever will not always actuate the Setting Pin into place. In summary: the Pin is to detent; the Selection Key is to be fully depressed; the Setting Lever is to be of the right length between the Pin and the Key; the Escapement Rod is to be level or tipped down at the rear. The Sector release has been omitted at this point since it can be adjusted after the preceding conditions are checked.

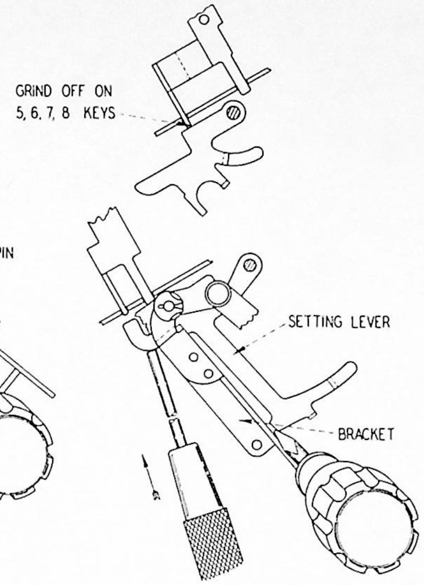


ST - S - STW - ACG - SW - SRW

ADJ. 57G SEGMENT RELEASE: The Segment should release just before the Unit escapes. Test by depressing the #9 Selection Key slowly. Adjust by forming the Segment Release Link at the Offset. After forming, check for binds. When the Segment Release Link is actuated, Point 1 is to travel below the upper surface of the Bottom Plate but not travel below the lower surface.



TO SHORTEN A SETTING LEVER



TO LENGTHEN A SETTING LEVER

ST - S - STW - ACG - SW - SRW

ADJ. 57H SETTING LEVER: To determine if a Setting Lever is 'long' or 'short', depress the #1 Selection Key and hold. Looking at the left row of Pins, increase the pressure on the Key. If the Setting Lever attempts to push the Setting Pin and move the Unit, the Lever is too long - but - this is passable if the escapement has occured prior to the 'hard pressing' on the key. The Unit will move only the amount necessary to remove the play at the Unit bearings. After this play has been removed, further movement of the Setting Lever is restricted; therefore, an exceptionally 'long' lever will stop the travel of the Key. If the Key travel is stopped, the escapement may not occur, but before shortening the Setting Lever, check that the Escapement Rod is not high at the rear, Adj. 57J or if on the #1, #4, #7 Keys check Adj. 57K. If satisfactory, then the Setting Lever may be shortened by the method illustrated (#3 position shown). The #1, #2, #3, #4 Levers may be shortened in this manner: The #5, #6, #8 cannot be. The bottom of the #5, #6, #7, #8 Keys may be ground, however, this action may be necessary for new parts only. The Escapement Rod can be tipped per Fig. 4, Adj. 57J to overcome this. To shorten a Setting Lever: Insert a screwdriver between the Setting Pin and the Setting Lever and press on the Selection Key. To lengthen a Setting Lever: Insert a screwdriver or a suitable block between the Setting Lever and the Bracket. Tap upwards on the opposite end of the Setting Lever with a punch.

KEEP OIL OFF THE SETTING LEVERS.

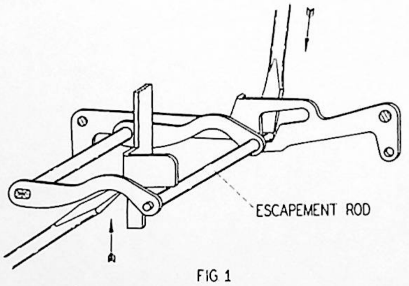


FIG 1

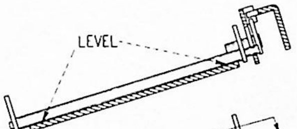


FIG. 2

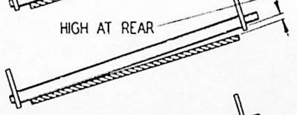


FIG 3

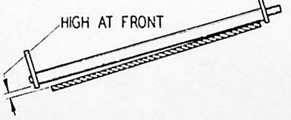
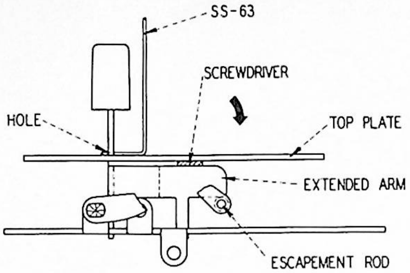
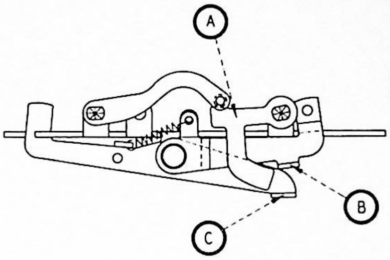


FIG 4

ST - S - STW - ACG - SW - SRW

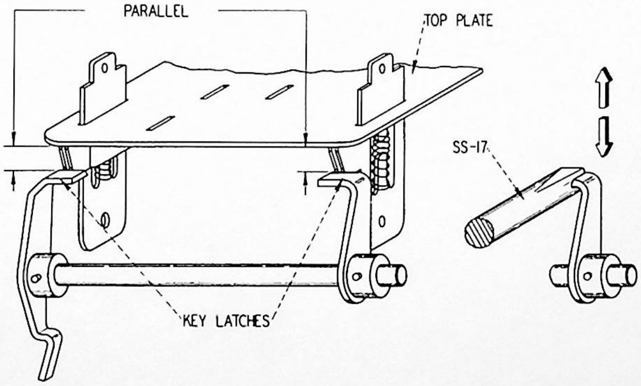
ADJ. 57J ESCAPEMENT ROD: The ideal alignment of the Escapement Rod is level with the Keyboard Bottom Plate, Fig. 2. If it is raised at the rear there will be a failure of Unit escapement, Fig. 3. The rear may be tipped down slightly, Fig. 4. This will speed up the escapement and is permissible when an escapement does not occur on a full key depression. A failure of escapement in this instance may be caused by a 'long' Setting Lever, see Adj. 57H. To align the Escapement Rod, form per Fig. 1. This illustrates how to lower the rear of the Rod.





ST - S - STW - ACG - SW - SRW

ADJ. 57K ALIGNMENT OF 1 - 4 - 7 KEYS: This adjustment is required whenever a full depression of each key fails to give a Unit Escapement and the cause of escapement failure is not a 'long' Setting Lever or the Escapement Rod being high at the rear. The Selection Key will limit on the Bottom Plate but the Extended Arm will not depress the Escapement Rod. Test by depressing the Key until stopped, hold the Key and press on the Escapement Rod. If the Unit Escapes the Extended Arm needs adjusting. Adjust by inserting SS-63 or a suitable object in the hole of the Keystem and insert a screwdriver between the underside of the Top Plate and the top of the Extended Arm and twist the screwdriver to lower the Arm. Do not over form or Interlock A will interfere with Interlocks B and C. Over forming will also cause the 1-4-7 keys to wobble when other Selection Keys are depressed.



ST - S - STW - ACG - SW - SRW

ADJ. 58A MULTIPLIER KEY LATCHES: Form the Key Latches so they are parallel with the Top Plate. The position of the Key Latches determine how much the Mult. Keys will be held down, therefore, the Key Latches should not be changed after the following adjustments are made.

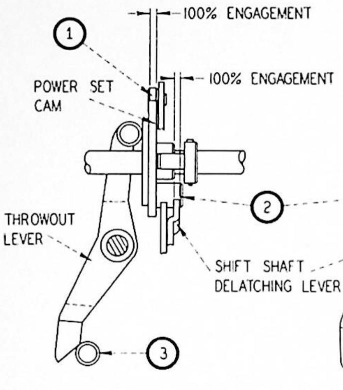


FIG. 1

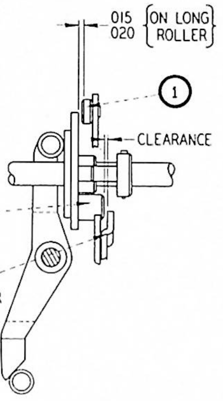


FIG 2

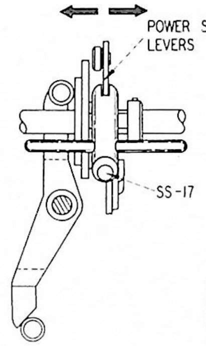


FIG. 3

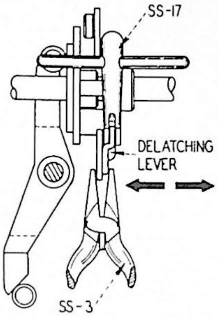


FIG. 4

ST - S - STW - ACG - SW - SRW

ADJ. 58B POWER SET CAM ALIGNMENT - EARLY STYLE: Fig. 1. During Multiplication, the Power Set Cam is not to bottom and it is to have 100% engagement with Roller 1. The Shift Shaft Delatching Lever is to have 100% engagement with Roller 2. Step 1. Bottoming of the Cam will restrict the raising of Roller 3, therefore not allowing the full positioning of the Power Set Shift Lever. Form the Throwout Lever if the Power Set Cam is bottoming. Step 2, Fig. 2. When the machine is in Home Position, Roller 1 is to clear the Power Set Cam. On later models having a short Roller 1 there is sufficient clearance. On earlier models having a long Roller 1 the clearance should be .015 - .020. Form the Power Set Levers with SS-17, Fig. 3, for this clearance. Step 3, Fig. 2. When the machine is in Home Position, Roller 2 is to sufficiently clear the Shift Shaft Delatching Lever. This clearance will vary depending on the engagement per Fig. 1. Form the Delatching Lever per Fig. 4, for the 100% engagement. Hold with SS-3 and form with SS-17.

Keep excess oil off Power Set Cam and Drive Shaft.

ADJUSTMENTS

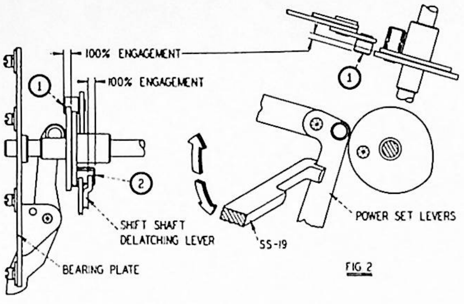


FIG 2

FIG 1

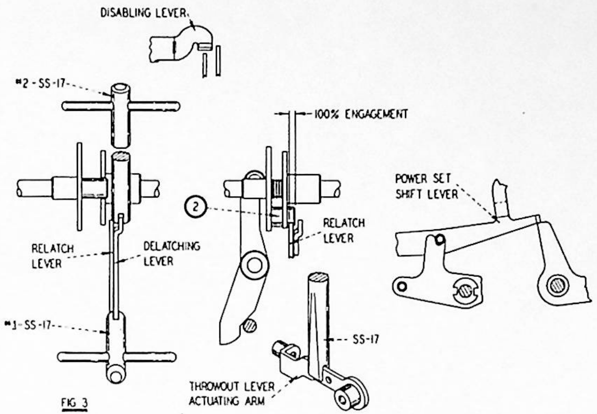


FIG 3

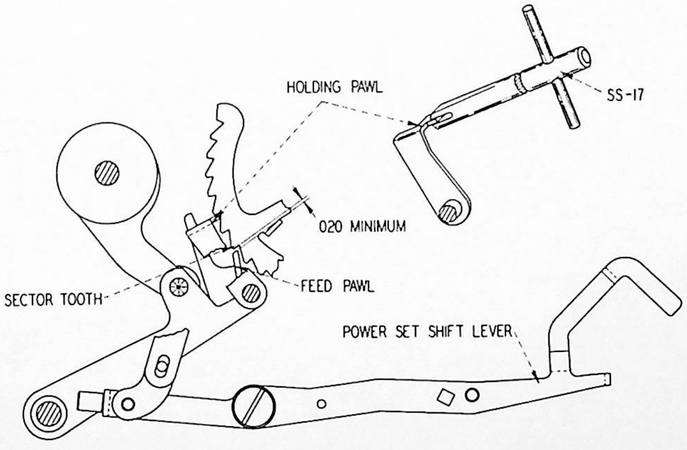
STW - ACG - SW - SRW

FIG 4

ADJ. 58B-1 POWER SET CAM ALIGNMENT - REVISED STYLE: Step 1, Fig. 1, position the Bearing Plate counter-clockwise until limited. Tighten the Screws and rotate the drive shaft to test for freeness. Step 2, Fig. 1, select a three, depress the Mult. Key and rotate the Drive Shaft until the Power Set Cam has moved completely in and the Segment is starting to feed out. The Power Set Cam is to have 100% engagement with Roller 1, and the Shift Shaft Delatching Lever is to have 100% engagement with Roller 2. Form the Power Set Levers, Fig. 2, to align Roller 1 to the Power Set Cam. To obtain the 100% engagement of the Delatching Lever to Roller 2, restore the machine, select a figure, depress the Disabling Lever and pull the Delatching Lever forward. Place the machine on its back, hold the Delatching Lever, Fig. 3, with #1 SS-17 and form with #2 SS-17. This also removes side play in the Delatching Lever, therefore, test that it is not too tight against the Relatch Lever. Step 3, Fig. 4, restore the machine and depress the Mult. Key. Rotate the Drive Shaft by hand until the Power Set Shift Lever has restored onto its latches and Roller 2 is picking up the Relatch Lever. The Relatch Lever is to have 100% engagement with Roller 2. Form the Throwout Lever Actuating Arm to the left to increase the engagement.

When the Power Set Shift Lever restores, the Throwout Lever Actuating Arm, actuated by the stud on the Relatch Lever takes over and holds the Throwout Lever. This action is necessary to keep Roller 2 of the Power Set Cam in contact with the Relatch Lever so the Shift Shaft Latch is relatched.

Keep excess oil off the Power Set Cam and Drive Shaft.



ST - S - STW - ACG - SW - SRW

ADJ. 58C MULTIPLIER SEGMENT HOLDING PAWL: Select a 9 in the first Sector of the Unit and pull the Repeat Key forward. Depress the Multiplier Key and cycle the Drive Shaft by hand until the Power Set Shift Lever has fully dropped. Continue to cycle the Drive Shaft until the Feed Pawl is at its lowest point of movement. At this point, check for a minimum of .020 clearance between the Feed Pawl and the Sector Tooth. The clearance will probably be greater which is good. Check this clearance with the Unit locked in Repeat Multiplication. Form the Holding Pawl with SS-17, if necessary. Check each tooth on the Segment. Check all Segments.

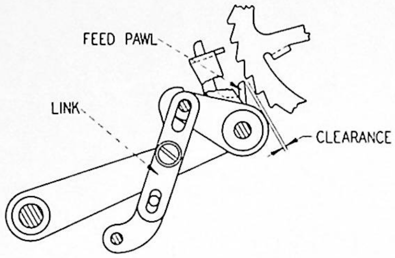


FIG 1

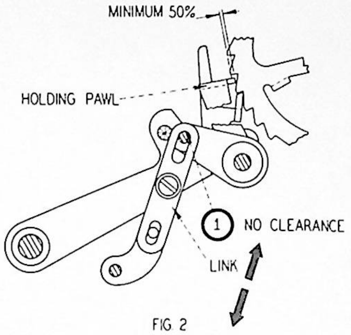


FIG 2

STW - ACG - SW - SRW

ADJ. 58D MULTIPLIER HOLDING PAWL LINK: Fig. 1. Select a number in the first Segment; depress the Plus Key and cycle the Drive Shaft by hand. The Feed Pawl should not contact the Segment Tooth. The Feed Pawl is held away by the Link. To adjust, depress the Multiplier Key and cycle the Drive Shaft until the Holding Pawl has dropped forward and into a Segment Tooth space, Fig. 2. Make sure the Power Set Shift Lever is down fully. Set the Link so the Holding Pawl contacts the Segment Tooth and so there is no clearance at Point 1. Test again per Fig. 1. Should the Feed Pawl contact the Segment Tooth, the Link can be readjusted to give the Holding Pawl no less than 50% engagement.

Oil the bearings.

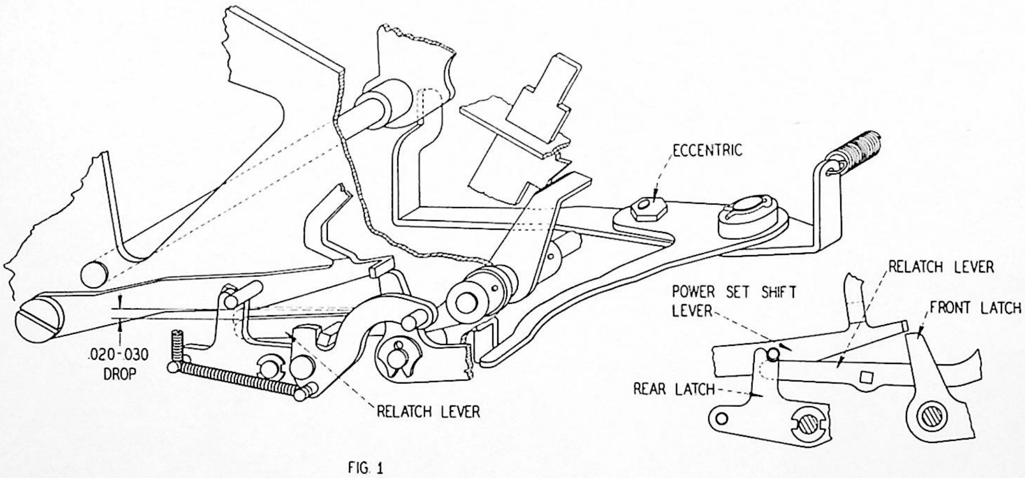


FIG 1

FIG 2

ST - S - STW - ACG - SW - SRW

ADJ. 59A MULTIPLIER KEYS RELEASE LEVER: Fig. 1. When the first selection is made into the Multiplier Unit, the Relatch Lever is to drop .020 - .030. Adjust at the Eccentric.

Reason for Adjustment: Fig. 2. To insure that the Relatch Lever will restore the Power Set Lever high enough to allow the Front Latch and the Rear Latch to latch the Power Set Shift Lever.

Oil the bearings.

ADJUSTMENTS

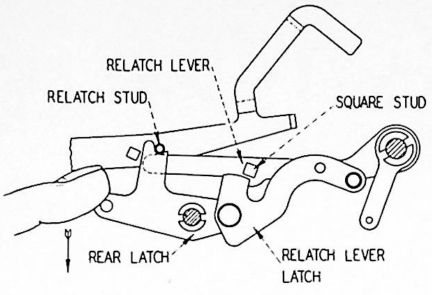


FIG. 1

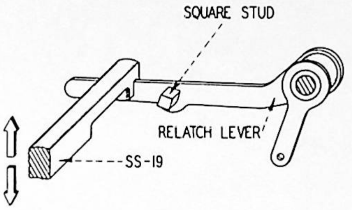
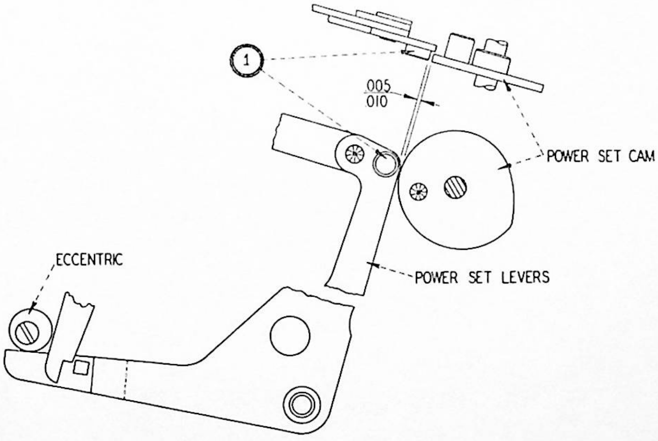


FIG. 2

ST - S - STW - ACG - SW - SRW

ADJ. 59B POWER SET RELATCH LEVER: Fig. 1. Have the Unit clear and the Carriage to the extreme left. Depress the Mult. Key (or the Clear-Mult Key SW) and hold down. Cycle the Drive Shaft until the Square Stud on the Relatch Lever has positioned on top of the Relatch Lever Latch. In this position move the Rear Latch from under the Relatch Stud and release it; the Rear Latch should reposition under the Relatch Stud. If it does not reposition, twist the Relatch Lever, Fig. 2, with SS-19 to lower the Square Stud.



ST - S - STW - ACG - SW - SRW

ADJ. 60A POWER SET LEVERS: Select a figure in the Unit, depress the Multiplier Key and cycle the drive shaft by hand until the Power Set Cam has moved in and positioned as illustrated. There is to be .005 - .010 clearance between Roller 1 and the Power Set Cam. Adjust at the Eccentric. Looking from the top will give a better view of the clearance.

ADJUSTMENTS

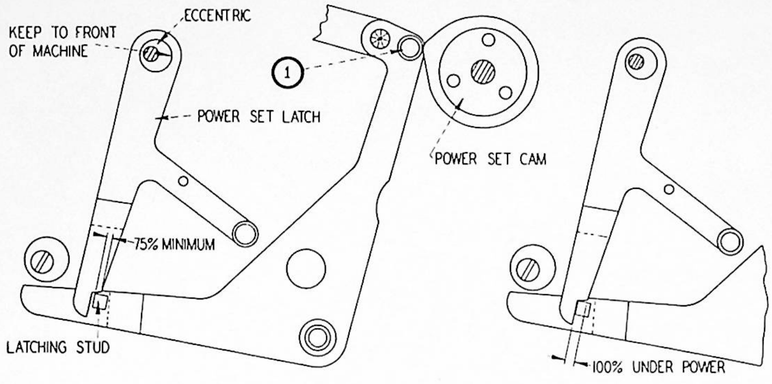
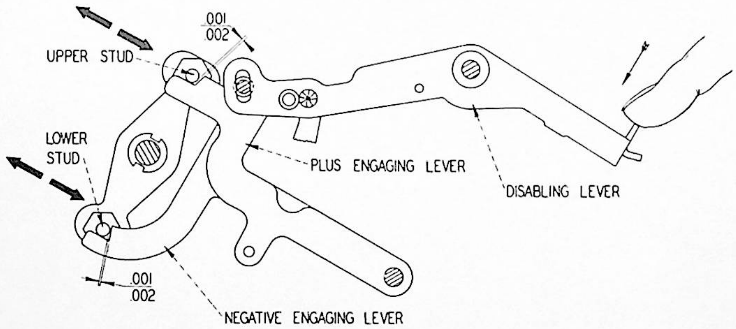


FIG 1 FIG 2

ST - S - STW - ACG - SW - SRW

ADJ. 60B POWER SET LATCH: During the cycling of the Drive Shaft under power, the Power Set Cam should not contact Roller 1 and cause a bounce to the Power Set Levers. Fig. 1, to adjust, select a figure in the Unit, depress the Multiplier Key and cycle the drive shaft by hand until the Power Set Cam has rotated to the high point of movement with Roller 1. At this point adjust the Eccentric to allow the Power Set Latch to slide onto the Latching Stud with 75% minimum engagement. Under Power this will allow the Power Set Latch to slide 100% onto the Latching Stud thus moving Roller 1 from contact with the Cam, Fig. 2.

Grease the Latching Stud.

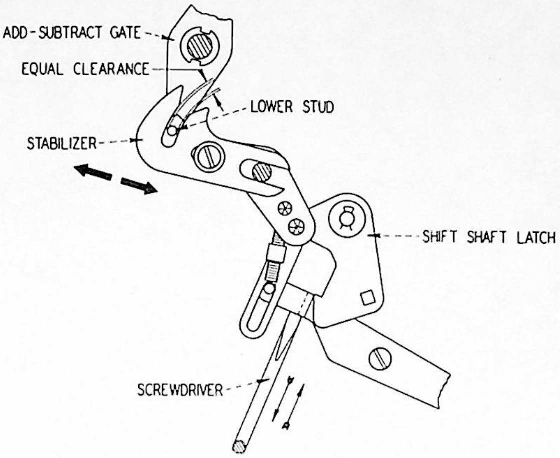


ST - S - STW - ACG - SW - SRW

ADJ. 60C GATE ACTUATING ARMS: Step 1. Select a figure in the Unit, depress the Multiplier Key and press on the Disabling Lever. The Plus Engaging Lever will engage with the Upper Stud; adjust the Upper Stud for .001 - .002 clearance. Step 2. Release the Multiplier Key and depress the Negative Multiplier Key and press on the Disabling Lever. The Negative Engaging Lever will engage with the Lower Stud; adjust the Lower Stud for .001 - .002 clearance.

Reason for Adjustment: To insure a good engaging action of the Add - Subtract Gate. A wide clearance might cause a delay in fully positioning the Add - Subtract Gears with the Dial Gears before the Add - Subtract Gears started to rotate, also the Cycle Lock Pin might not be moved far enough to catch onto the Cycle Lock Cam.

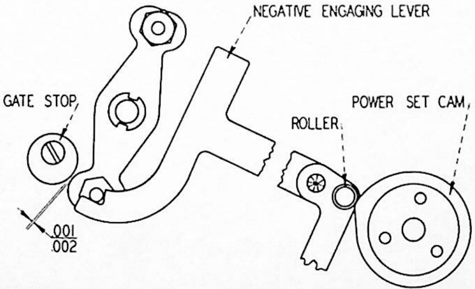
Grease the Studs.



ST - S - STW - ACG - SW - SRW

ADJ. 60D ADD - SUBTRACT GATE STABILIZER: When the Gate is in Home Position, manually delatch the Shift Shaft Latch. The Stabilizer is to straddle the Lower Stud with equal clearance. Raise and lower the Stabilizer by using a finger or a screwdriver.

Grease the Lower Stud.

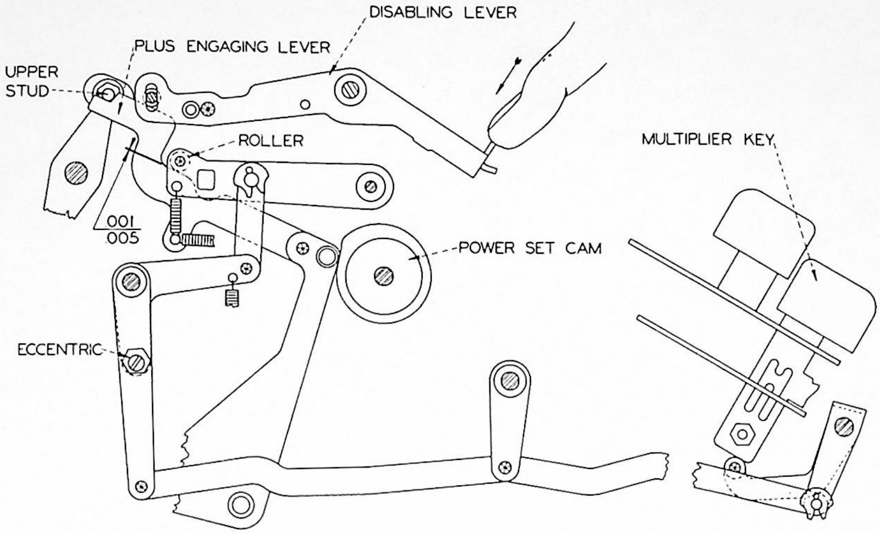


ST - S - STW - ACG - SW - SRW

ADJ. 60E GATE STOP - NEGATIVE MULTIPLICATION: Cycle the Drive Shaft by hand in Negative Multiplication until the Power Set Cam is on the high point of movement with the Roller. Adjust the Gate Stop for .001 - .002 clearance to the Gate Arm.

Reason for Adjustment: To provide a stop for the left side of the Add - Subtract Gate during Negative Multiplication so the Add - Subtract Gears do not contact the Transfer Gears.

NOTE: If the Power Set Latch, Adj. 60B, does not position onto the Latching Stud during Negative Multiplication, recheck the right Gate Stop, Adj. 51B, and Engaging Levers, Adj. 60C.



ST - S - STW - ACG - SW - SRW

ADJ. 61A ADD - SUBTRACT GATE ACTUATING BELLCRANK: Select a figure in the Unit, depress the Multiplier Key and press on the Disabling Lever. Adjust the Eccentric to obtain .001 - .005 clearance between the Roller and the Plus Engaging Arm. This will allow the Plus Engaging Lever to contact the Upper Stud.

Reason for Adjustment: To position the Plus Engaging Lever in full contact with the Upper Stud so it does not slip under the Stud when actuated by the Power Set Cam.

Oil the bearings.

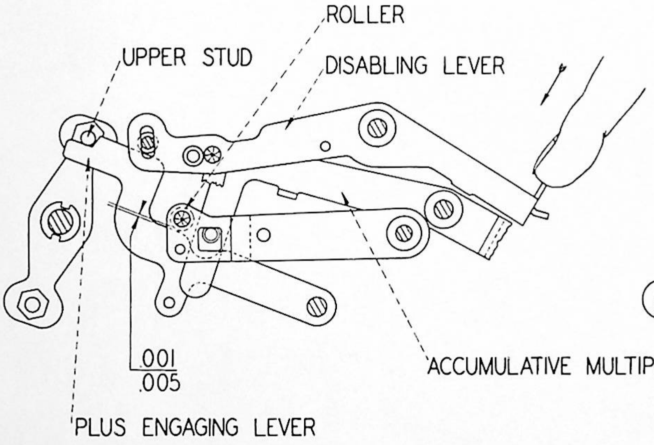


FIG. 1

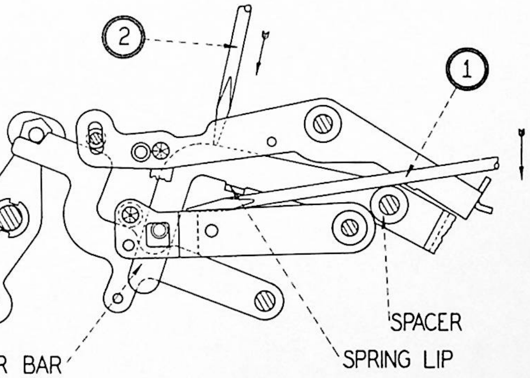


FIG. 2

ST - STW - ACG - SRW

ADJ. 61B ACCUMULATIVE MULTIPLIER BAR: Fig. 1, Select a figure in the Unit, depress the Accumulator Key and press on the Disabling Lever. The Plus Engaging Lever is to stop against the Upper Stud and there is to be .001 - .005 clearance between the Roller and the Plus Engaging Lever. To obtain the clearance, Fig. 2, release the Accumulator Key and depress the Negative Key. Insert Screwdriver 1 under the Spring Lip and over the Spacer and move in the direction of the Arrow. To decrease the clearance, press on the Accumulative Multiplier Bar with Screwdriver 2.

Reason for Adjustment: To insure a positive engagement between the Plus Engaging Lever and the Upper Stud so the Plus Engaging Lever does not slip under when actuated by the Power Set Cam.

Oil the bearings.

7-2-56	Destroy Page 91 No Revision	Insert This Page	Revision 1

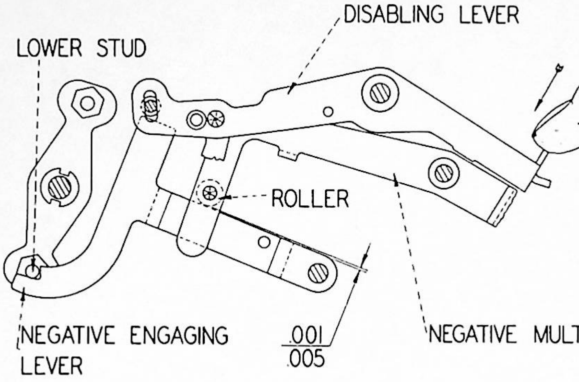


FIG. 1

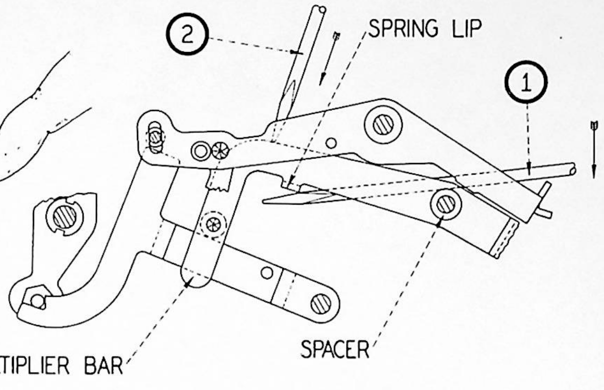


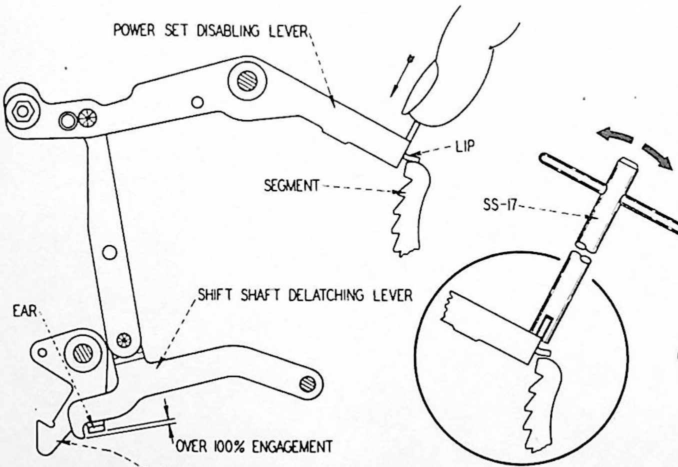
FIG. 2

ST - S - STW - ACG - SW - SRW

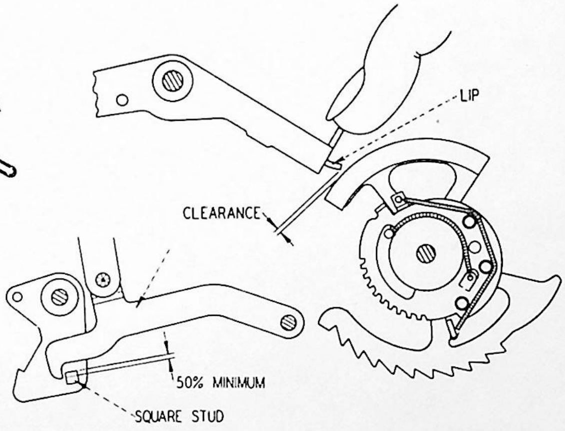
ADJ. 61C NEGATIVE MULTIPLIER BAR: Fig. 1, Select a figure in the Unit, depress the Negative Key and press on the Disabling Lever. The Negative Engaging Lever is to stop against the Lower Stud and there is to be .001 - .005 clearance between the Roller and the Negative Engaging Lever. To obtain this clearance, Fig. 2, release the Negative Key and depress the Accumulator Key. Insert Screwdriver 1 under the Spring Lip and over the Spacer and move in the direction of the arrow. To decrease the clearance, press on the Negative Multiplier Bar with Screwdriver 2.

Reason for Adjustment: To insure a positive engagement between the Negative Engaging Lever and the Upper Stud so the Negative Engaging Lever does not slip under when actuated by the Power Set Cam.

Oil the bearings.



REVISED STYLE

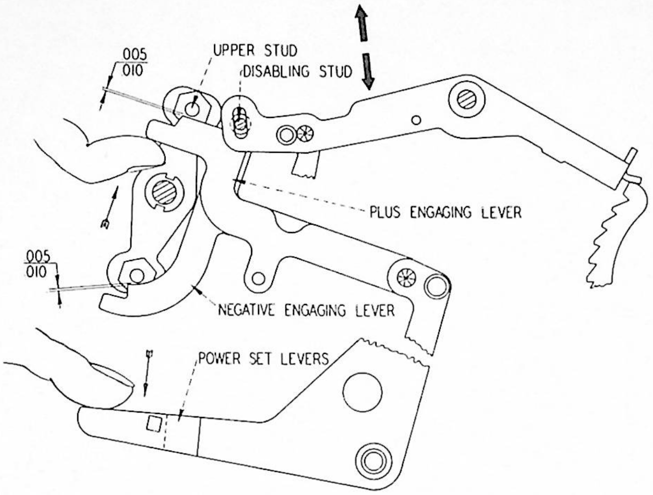


ST - S - STW - ACG - SW - SRW

EARLY STYLE

ADJ. 62A, REV. 1 - POWER SET DISABLING LEVER LIP: Place zeros in the Unit and press the Lip of the Disabling Lever against the Segment. The Shift Shaft Delatching Lever is to have over 100% engagement with the Ear of the Shift Shaft Latch. Form the Lip per inset. After forming, select 9's and depress the Neg Mult Key. Press down on the Disabling Lever. The Lip should clear the numbered part of all Segments.

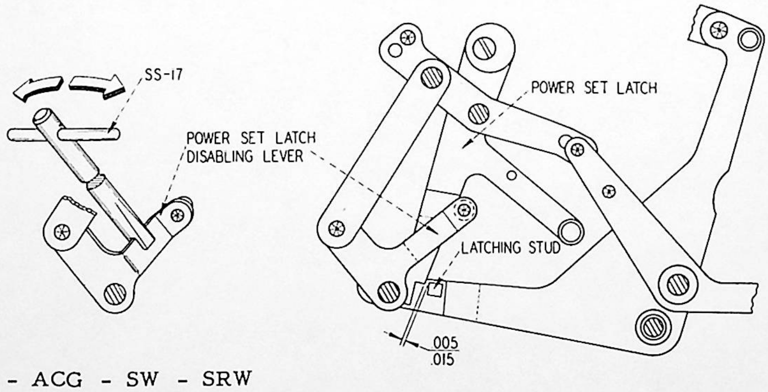
Reason for Adjustment: To insure sufficient engagement of the Delatching Lever with the Ear when the Sector is fed to zero. Insufficient engagement will cause the Delatching Lever to be pulled over the top of the Ear and cause it to jam on the front side.



ST - S - STW - ACG - SW - SRW

ADJ. 62B POWER SET DISABLING LEVER STUD: Place Zeros in the Unit. Raise the Plus Engaging Lever and press on the rear of the Power Set Levers. Adjust the Disabling Stud to obtain .005 - .010 clearance between the Plus Engaging Lever and the Upper Stud. Check the Negative Engaging Lever in the same manner for .005 - .010 clearance.

Reason for Adjustment: To prevent the Plus and the Negative Engaging Levers from contacting the Studs during the Shift Cycle in multiplication. Select figures in Unit, cycle the drive by hand, and observe the action the Engaging Levers have when disengaged from their Studs at the time of Carriage Shift. Try in Negative and Positive operations.



ST - S - STW - ACG - SW - SRW

ADJ. 62C POWER SET LATCH DISABLING LEVER: When the machine is in Home Position, the Power Set Latch Disabling Lever is to hold the Power Set Latch away from the Latching Stud by .005 - .010. Adjust by forming with SS-17.

Reason for Adjustment: To prevent the Power Set Latch from engaging the Latching Stud.

Oil the bearings.

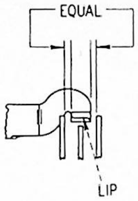


FIG 1

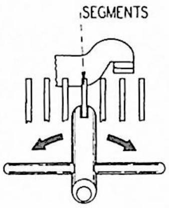


FIG 2

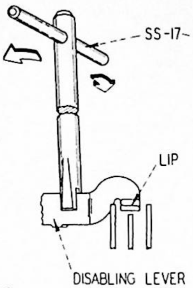


FIG 3

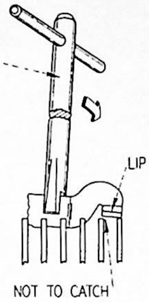


FIG 4

ST - S - STW - ACG - SW - SRW

ADJ. 62D POWER SET DISABLING LEVER - ALIGNMENT TO SECTORS: Fig. 1. Select 01 in the Unit and depress the Disabling Lever. The Lip should be centered between the Segments. Step 1, Fig. 2. Straighten all Sectors with SS-17. Step 2, Fig. 3. Align the Lip by forming the Disabling Lever with SS-17. Step 3, Fig. 4. Tip the Lip slightly to prevent the left edge catching on the Segments as the Unit shifts to the right.

Grease the Segment ends.

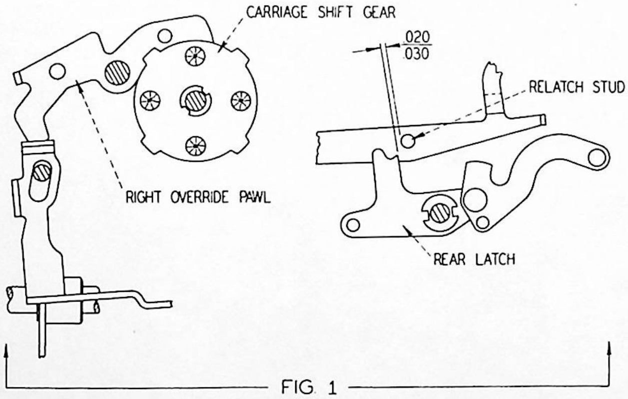


FIG. 1

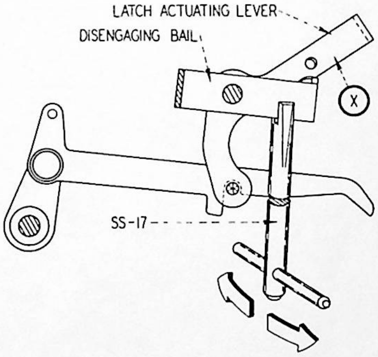


FIG. 2

STW - ACG - SW - SRW - ST - S

ADJ. 63A POWER SET SHIFT LEVER DISENGAGEMENT: Depress and hold the Left Shift Key. Rotate the drive shaft by hand until the Carriage Shift Gear, Fig. 1, has actuated the Right Override Pawl to its maximum movement. The Rear Latch is to move back and clear the Relatch Stud by .020 - .030. Form the Disengaging Bail to obtain the clearance, Fig. 2. On ST - S models twist the part similar to the Latch Actuating Lever, Fig. 2. Twist at X.

Reason for Adjustment: To insure there is sufficient clearance between the Relatch Stud and the Rear Latch during the dropping of the Power Set Shift Lever at the beginning of Multiplication. Insufficient clearance may cause a drag on the Power Set Shift Lever thus preventing the full positioning of the Multiplier Feed Pawl.

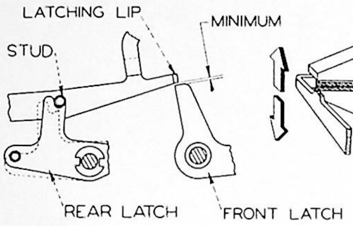


FIG 1

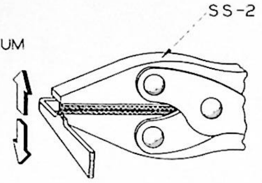


FIG 2

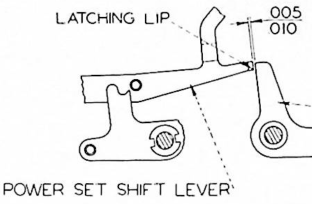


FIG 3

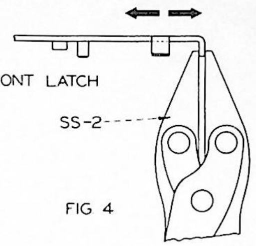
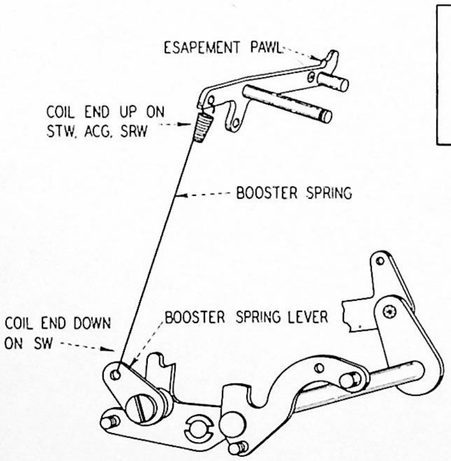
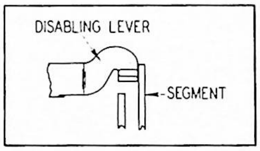


FIG 4

ST - S - STW - ACG - SW - SRW

ADJ. 63B POWER SET SHIFT LEVER - LATCHING LIP: Step 1, Fig. 1. Machine in Home Position. Manually move the Front Latch out and under the Latching Lip. The clearance between the two parts should only be enough to allow the Front Latch to move under the Lip without sticking. To check; Depress the Rear Latch and release; the Rear Latch should latch back under the Stud. Form the Latching Lip up or down, Fig. 2. Step 2, Fig. 3. Depress the Multiplier Key and cycle the drive shaft by hand until the Front Latch is pulled from under the Latching Lip. There should be .005 - .010 clearance to allow the free dropping of the Power Set Shift Lever during Multiplication. Form the Latching Lip, Fig. 4. Take care when forming the Latching Lip because it breaks easily.



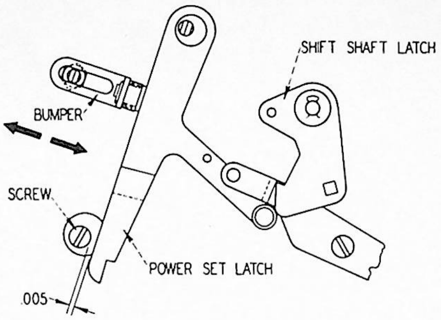


STW - SW - ACG - SRW

ADJ. 63C ESCAPEMENT PAWL BOOSTER SPRING: Loosen the Booster Spring Lever enough for slippage. Have the Unit in first position, depress and hold a Selection Key. Move the Booster Spring Lever so there is no stretching of the Booster Spring. Release the Selection Key. Hold the Booster Spring Lever with pliers and tighten its screw. When the Escapement Pawl is in Home Position, the Booster Spring is not to press upward on the Pawl. Pressure will hold the Pawl from a full engagement with the Escapement Comb during Selection.

Reason for Adjustment: To prevent the Escapement Pawl from bouncing out of the Comb which would cause the Unit to drop back and position the Segment against the Disabling Lever.

12-15-58	Destroy Page 95 No Revision	Insert This Page	Revision 1



ST - S - STW - ACG - SW - SRW

ADJ. 64 POWER SET LATCH BUMPER: Manually delatch the Shift Shaft Latch and adjust the Bumper to stop the Power Set Latch about .005 from contacting the Screw.

Reason for Adjustment: Prevent noise. Also if the Power Set Latch is stopped too early, the travel of the Shift Shaft will be restricted and a failure of shift may occur.

(ADJ. 65 DELETED)

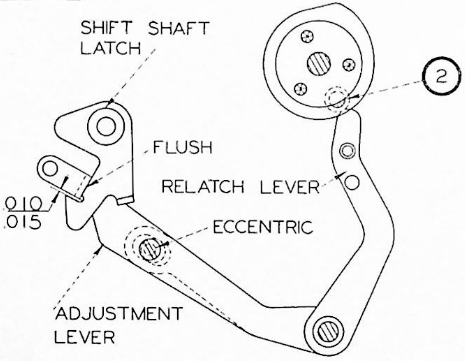


FIG. 1

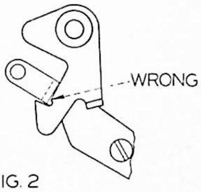


FIG. 2

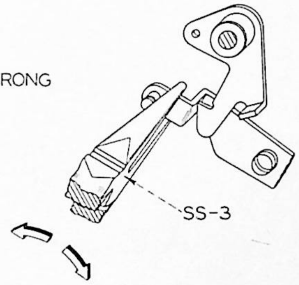
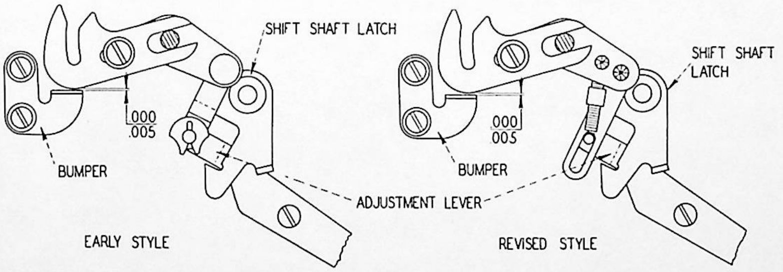


FIG. 3



EARLY STYLE

REVISED STYLE

ST - S - STW - ACG - SW - SRW

ADJ. 66A, REV. 1 - POWER SET LATCH RELEASE LEVER RELATCHING: (1) Release the Clutch and rotate the Drive Shaft by hand until Roller 2 is on the high point of movement with the Relatch Lever. The Adjustment Lever is to overlatch the Shift Shaft Latch by .010 - .015. Adjust at the Eccentric. The Shift Shaft Latch is to rest flush against the end of the Adjustment Lever, Fig. 1 - not as illustrated in Fig. 2. To align, twist with SS-3, Fig. 3. Whenever this adjustment is changed, check Adj. 66B.

(2) Stabilizer Bumper: Release the Clutch and cycle the Drive Shaft by hand until the Adjustment Lever has reached its maximum overlatch. Form the Bumper for .000 - .005 to stabilizer.

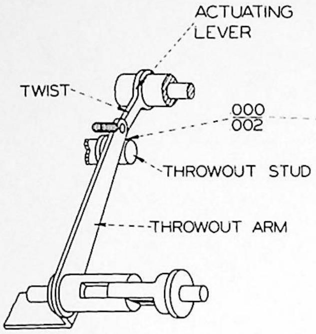


FIG 1

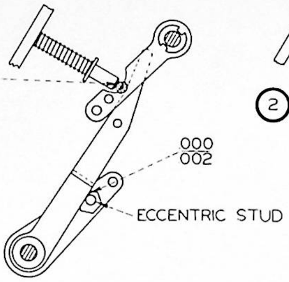


FIG 2

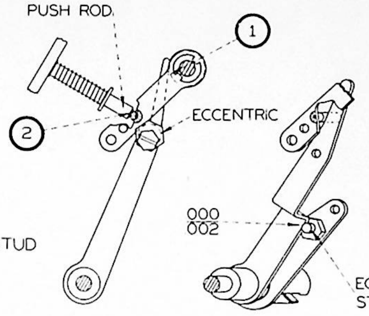
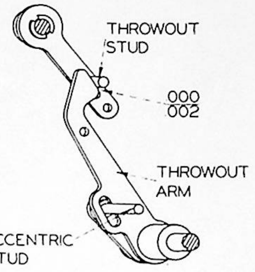


FIG 3



ST - S - STW - ACG - SW - SRW

ADJ. 66B CARRIAGE SHIFT THROWOUT ARM: Select two or more figures in the Unit to position the Carriage Shift Throwout Arm over the Throwout Stud. There is to be .000 - .002 clearance. Fig. 1, Gray Line Style. Twist the Actuating Lever. Fig. 2, Early "W" Line Style. Turn the Eccentric Stud. Fig. 3, Revised "W" Line Style. 1st - Adjust Eccentric to remove play between Points 1 and 2. Do not move the Push Rod to the rear. 2nd - Adjust the Eccentric Stud. Fig. 4, Second Revised "W" Line Style. Turn the Eccentric Stud.

Reason for Adjustment: To remove all excess play to insure a shift cycle. Too much play will cause a delay in actuating the Push Rod.

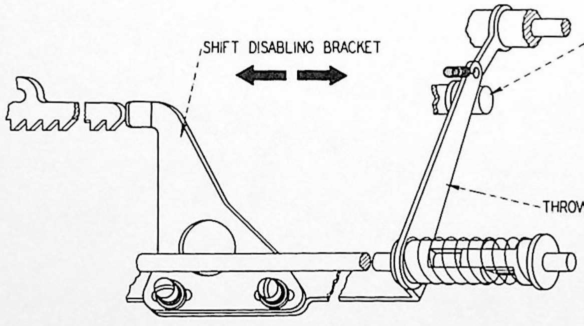


FIG. 1

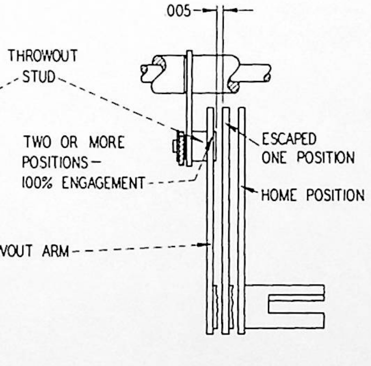


FIG 2

ST - S

ADJ. 66C CARRIAGE SHIFT THROWOUT - GRAY LINE: Fig. 2. When the Unit is escaped one position, the Throwout Arm is to clear the Stud at least .005 and when escaped two or more positions the Throwout Arm is to be 100% on the Throwout Stud. Adjust by moving the Shift Disabling Bracket, Fig. 1. (For 'W' Line Adjustment, see Adj. 70F.)

Reason for Adjustment: To insure that a Carriage Shift does not occur with the Unit escaped one position.

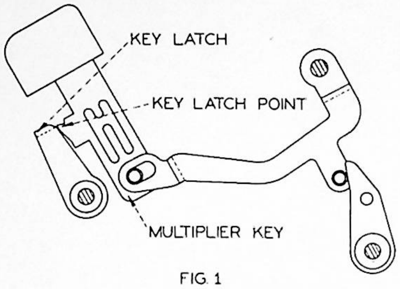


FIG. 1

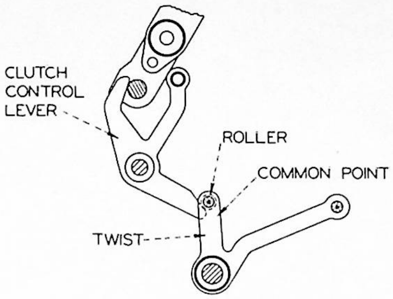


FIG. 2

STW-10	530127
STW-8	335520
SW-10	914644
SW-8	713545
SRW-10	876573
ACG-10	530113

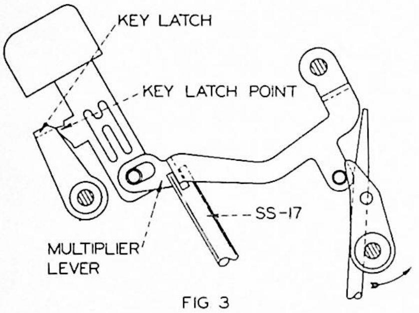


FIG 3

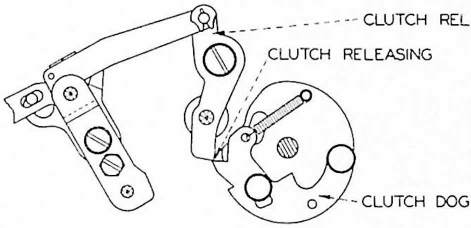


FIG. 4

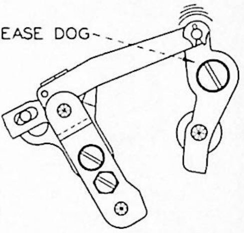


FIG. 5

STW - ACG - SW - SRW

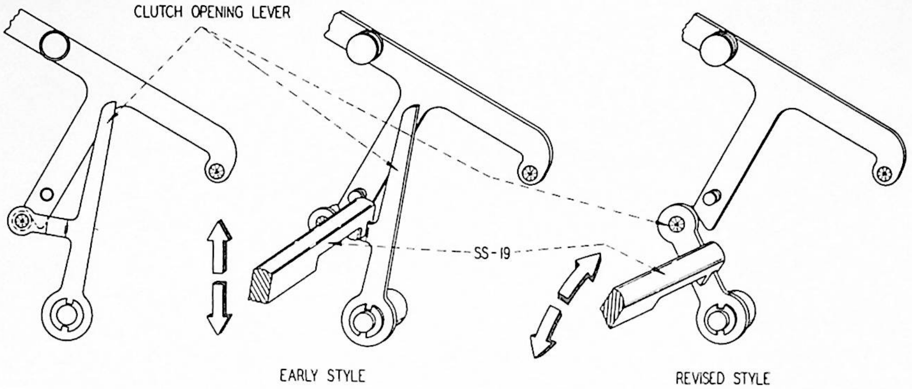
ADJ. 67A CLUTCH RELEASING - MULTIPLIER KEY: The Clutch Releasing on machines prior to the serial numbers in the Inset is controlled at the Common Point, Fig. 2. The Clutch releasing is to occur slightly before the Key Latch engages the Key Latch Point, Fig. 1. This may cause the Clutch Release Dog to shake during the Drive Shaft cycling, Fig. 5. This shake is permissible to the extent that there is no rattle of the Clutch Release Dog.

Early Clutch Releasing: Delay by twisting the Common Point to move the Roller away from the Clutch Control Lever.
Late Clutch Releasing - (rattle): Increase by twisting the Common Point to move the Roller against the Clutch Control Lever.
Whenever the Common Point is adjusted always recheck Adj. 30 and Adj. 40F.

The Clutch releasing on machines above the serial numbers shown can be adjusted so the Clutch releases, Fig. 4, as the Key Latch slips over the Key Latch Point, Fig. 3. This delay is possible because the Clutch Dog has been revised to provide a delayed Clutch Releasing. On machines equipped with this Clutch there will be no rattle during the Drive Shaft Cycling. Before adjusting, check Adj. 26A and Adj. 38 for the setting of the Common Point, then control the Multiplier Key Clutch Releasing by adjusting the Multiplier Lever.

Early Clutch Releasing: Delay by inserting a screwdriver as illustrated, Fig. 3, and moving it in the direction of the arrow.
Late Clutch Releasing - Key Latched and Clutch not Released: Increase by twisting with SS-17 at the offset.

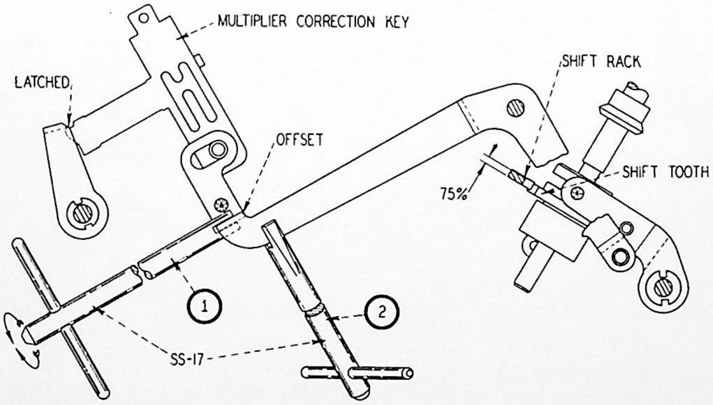
See Adj. 79 for Model ST - S Clutch Releasing.



STW - ACG - SRW

ADJ. 67B CLUTCH RELEASING - ACCUM. - NEG.: Twist the Arm of the Clutch Opening Lever to obtain a simultaneous Clutch Releasing and Key latching of the Accumulative Key on machines above the serial numbers shown on Adj. 67A. The Clutch Releasing on the Negative Key may be slightly ahead of the Accumulative Key Latching after the Accumulative Key adjustment. On machines prior to the serial numbers given in Adj. 67A, delay the Clutch releasing as much as possible without getting a Clutch rattle.

See Adj. 79 for Model ST - S Clutch Releasing.



STW - ACG - SRW

ADJ. 67C MULTIPLIER CORRECTION LEVER: When the Multiplier Correction Key is latched, the Shift Tooth is to engage the Shift Rack approximately 75%. Form the Offset with #1 SS-17, hold with #2.

Reason for Adjustment: To insure a good engagement during Multiplier Correction. Too deep of an engagement can cause the Shift Tooth to go above the Shift Rack if the Correction Key is depressed sharply.

Oil the bearings.

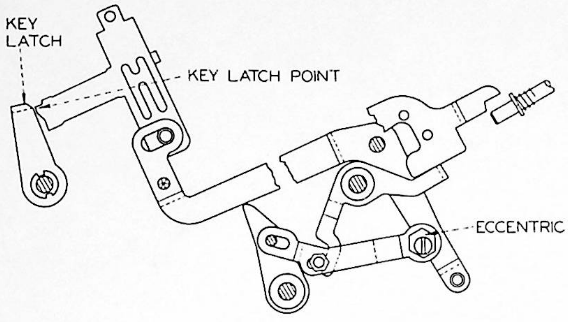


FIG 1

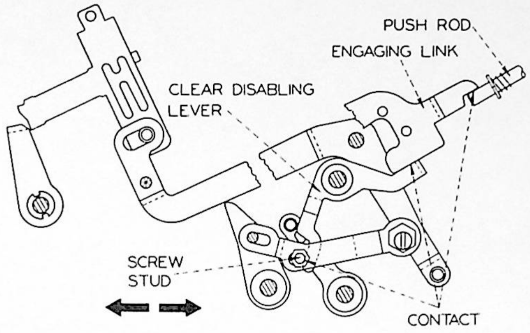


FIG 2

STW - ACG - SRW

ADJ. 67D CLUTCH RELEASING - MULTIPLIER CORRECTION: Step 1, Fig. 1. The Clutch should release as the Key Latch engages the Key Latch Point. Adjust the Eccentric. A simultaneous Key Latching and Clutch Releasing can be obtained on machines above the serial number per Adj. 67A. A clutch vibration is permissible on machines below these serial numbers. Step 2, Fig. 2. When the machine is in Home Position, the Clear Disabling Lever is to contact the Screw Stud and the Engaging Link without holding the Engaging Link away from the Push Rod. Slide the Screw Stud front or rear.

Oil the bearings.

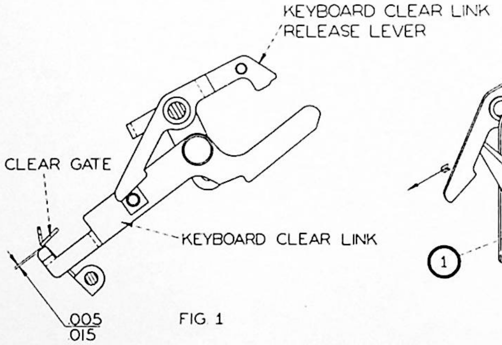


FIG 1

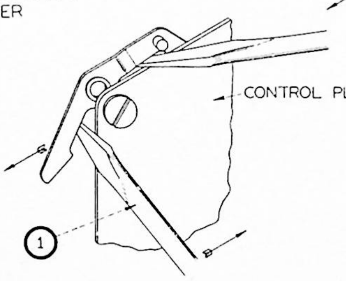


FIG 2

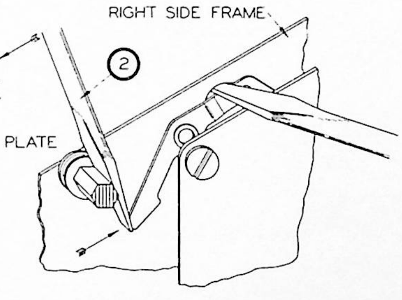


FIG 3

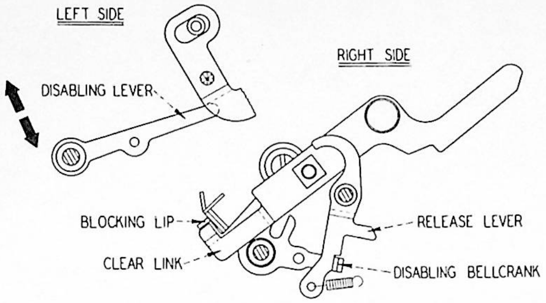
STW - SW - ACG - SRW - CW - DW

ADJ. 67E KEYBOARD CLEAR LINK: Fig. 1. Check the clearance of the Keyboard Clear Link to the Clear Gate. With the Add Key down, cycle the machine by hand in these operations: Multiplication, Enter Dividend, Carriage Clear. The Clear Link should move under the Clear Gate by .005 to .015 on the operating Keys that depress the Clear Link the least. To decrease the clearance: Insert two screwdrivers per Fig. 2 and move Screwdriver 1 in the direction of the arrows. To increase the clearance. Insert two screwdrivers per Fig. 3 and move Screwdriver 2 in the direction of the arrows.

Reason for Adjustment: To insure the Keyboard will be cleared. Too wide a clearance will cause the Clear Link to miss the Clear Gate. Too little, will cause the Clear Link to flick the Clear Gate and clear the Keyboard prematurely.

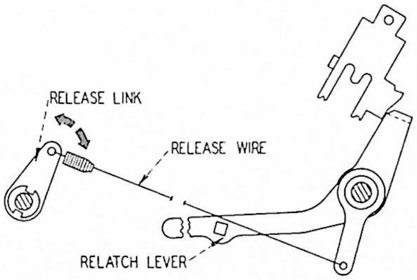
Oil the bearings.

ADJUSTMENTS



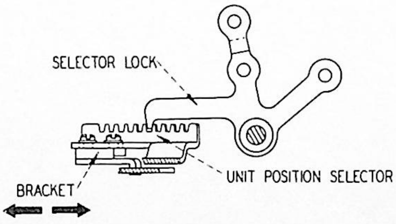
STW - ACG - SRW

ADJ. 68 KEYBOARD CLEAR DISABLING - MULTIPLIER CORRECTION: When the Add Key is down and the Mult. Correction Key is latched, the Disabling Bellcrank is to move down enough to allow the Release Lever to swing into latching position. Form the Disabling Lever. The Blocking Lip should be formed enough to the rear to prevent the Clear Link from slipping off and catching as it moves to the rear.



STW - ACG - SRW

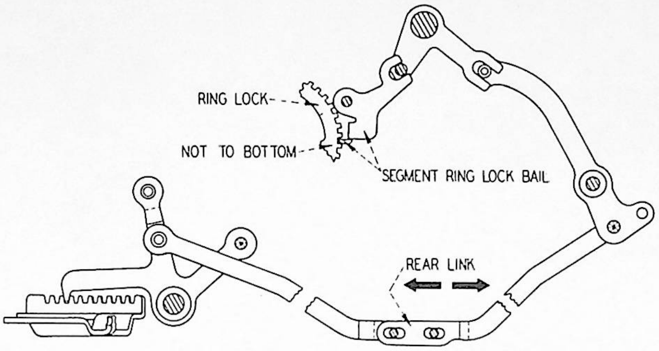
ADJ. 69 MULTIPLIER KEY RELEASE: When the Unit is escaped one or more positions, the Release Wire should be taut but not raising the Relatch Lever. Adjust the Release Link.



STW - ACG - SRW

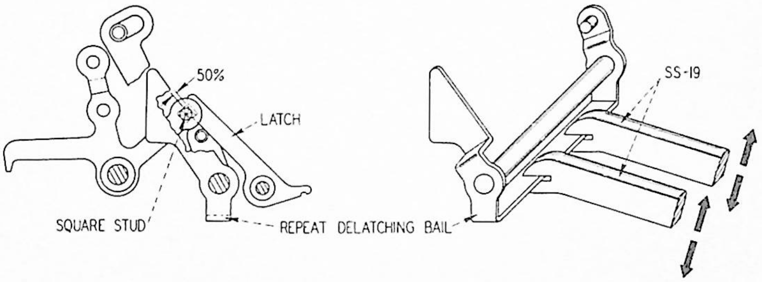
ADJ. 70A UNIT POSITION SELECTOR - REPEAT MULTIPLICATION: Select a figure in the Unit and pull forward on the Repeat Key. The Selector Lock should move the Unit Position Selector to the rear. Test in each position and adjust the Bracket to allow the maximum rear motion without causing a hard Repeat Key action as the Selector Lock enters a tooth space.

Reason for Adjustment: In Repeat Multiplication the Escapement Pawl is held disengaged from the Comb. This allows the Unit to move to the left and brings the Shift Rack out of alignment with the Shift Tooth. The Unit Position Selector is pushed to the rear as much as possible to hold the Unit as near to the position held when the Escapement Pawl is engaged during regular multiplication.



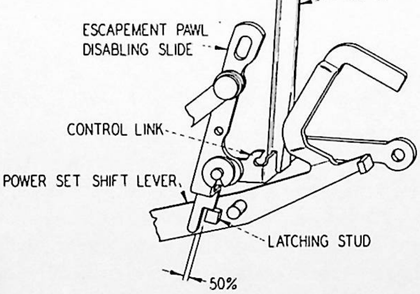
STW - ACG - SRW

ADJ. 70B SEGMENT RING LOCK BAIL: When the Repeat Key is in the forward position, the Segment Ring Lock Bail is to engage the Ring Lock without bottoming. Adjust at the Reat Link.



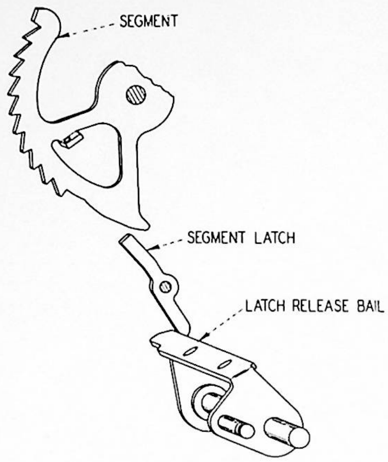
STW

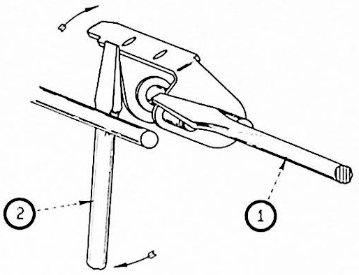
ADJ. 70C REPEAT DELATCHING BAIL - EARLY STYLE: When the Repeat Key is forward, the Latch is to have 50% engagement with the Square Stud. To adjust, twist the Repeat Delatching Bail with two SS-19. Check for binds after adjusting. The Latch should delatch just before the Clutch releases on a slow depression of the Multiplier Correction Key.



STW - ACG - SRW

ADJ. 70D ESCAPEMENT PAWL DISABLING SLIDE: The Escapement Pawl Disabling Slide is to engage 50% of the Latching Stud during Repeat Multiplication. The Control Link can be formed to obtain this engagement. If the engagement is too deep, the Escapement Pawl Disabling Slide can catch the Latching Stud when the Power Set Shift Lever restores at the end of regular Multiplication.





STW - ACG - SRW

ADJ. 70E LATCH RELEASE BAIL: When the Unit restores to position in Repeat Multiplication, the Latch Release Bail is to delatch the Segment Latch. This releases the Segment to the original selected position. To test, place all Zeros in the Unit, pull the Repeat Key forward and multiply once. To form the Latch Release Bail forward clear out the Repeat figures, place the machine on its back, insert Screwdriver 1 between the Left Frame and the Bail, insert Screwdriver 2 to the rear of the right side of the Bail. Move Screwdriver 2 in the direction of the Arrows. To move the Bail rearward, reverse the position of Screwdriver 2. If the Bail is too far forward, it will stop the Unit by catching on the side of the Segment Latch.

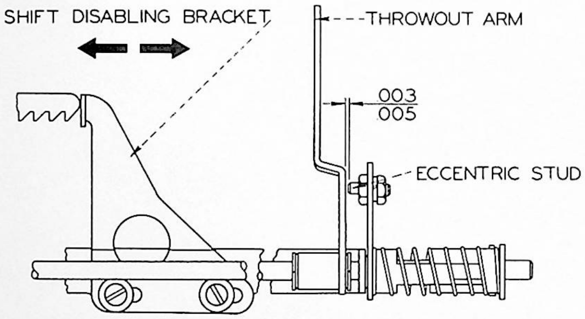


FIG. 1 EARLY STYLE

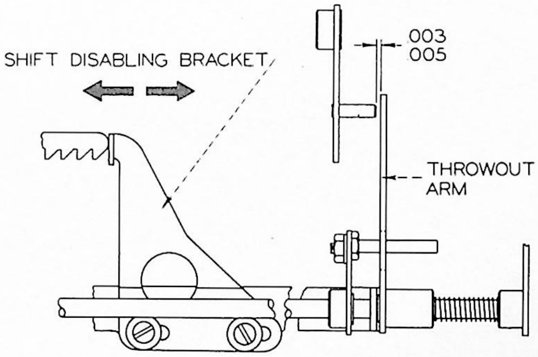


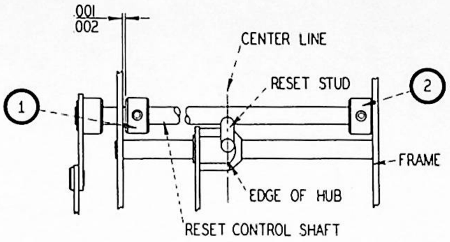
FIG. 2 REVISED STYLE

STW - ACG - SRW - SW

ADJ. 70F CARRIAGE SHIFT THROWOUT - "W" LINE: Fig. 1, Early Style. Escape the Unit one position by selecting a figure in the first segment. Pull the Repeat Key forward and Multiply. After the Unit has returned to position, the Eccentric Stud is to clear the Throwout Arm by .003 - .005. Adjust by moving the Shift Disabling Bracket. With the Unit escaped two or more positions, the Eccentric Stud is to have 100% engagement with the Throwout Arm. Fig. 2, Revised Style. The same clearances apply to this style. Operate the machine in the same manner and adjust the Shift Disabling Bracket.

The clearances apply to the model SW by escaping the Unit one position and adjusting the Shift Disabling Bracket.

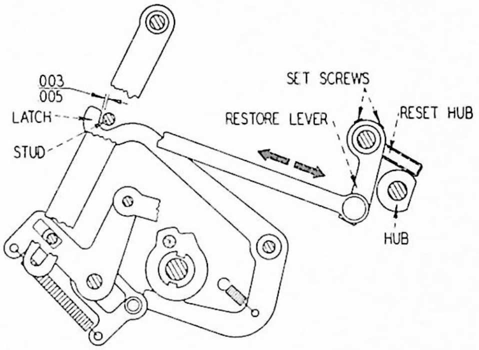
Oil the bearings.



SW

ADJ. 71A RESET CONTROL SHAFT: When the Unit is shifting to the extreme right, the edge of the Hub is to pass the Center line of the Reset Stud before the Unit drops back. Adjust by loosening Collars 1 and 2 and moving the Reset Control Shaft right or left. When set, position and tighten Collar 2 against the Frame then position and tighten Collar 1 for .001 - .002 end play.

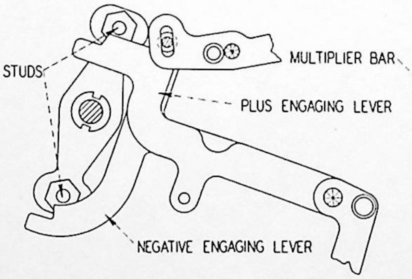
Grease the Hub. Oil the bearings.

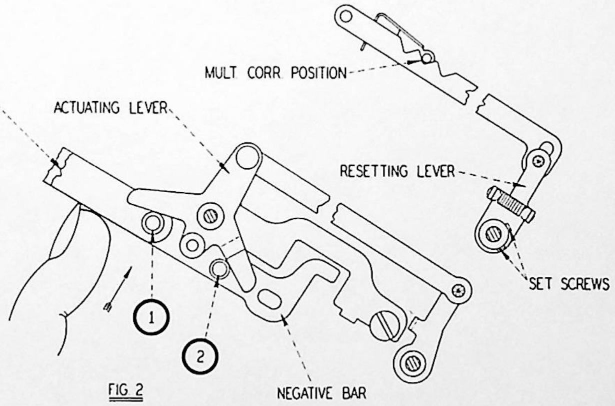


SW

ADJ. 71B RESET CONTROL LEVERS: When the Unit is shifting to the extreme right and the Reset Stud is on the Hub, there is to be .003 - .005 clearance between the Stud and the Latch. Adjust by loosening the Set Screws and moving the Restore Lever.

Oil the bearings.

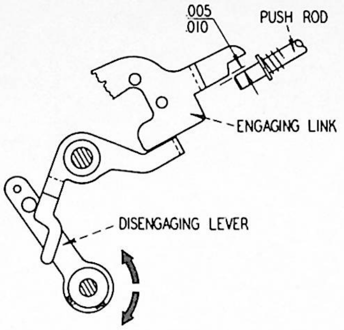




SW FIG 1 FIG 2

ADJ. 71C MULTIPLIER BAR ACTUATING LEVER: Fig. 1. The Plus and Negative Engaging Levers are not to engage their Studs in Multiplier Correction. Fig. 2. Loosen the Set Screws in the Resetting Lever and position the Multiplier Setting Key in the Mult. Correction position. Press upwards simultaneously on the Multiplier Bar and the Negative Bar, keeping the tops even, until Rollers 1 and 2 have pressed against and centralized the Actuating Lever. Tighten the Set Screws.

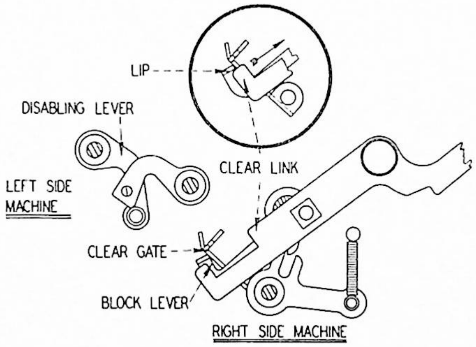
Oil the bearings.



SW

ADJ. 71D CLEAR DISABLING LEVER - MULT. CORRECTION: When the Multiplier Setting Lever is pulled to the Mult. Correction position, the Engaging Link is to clear the Push Rod by .005 - .010. Adjust by rotating the Disengaging Lever.

Reason for Adjustment: To prevent a carriage clear on Mult. Correction.

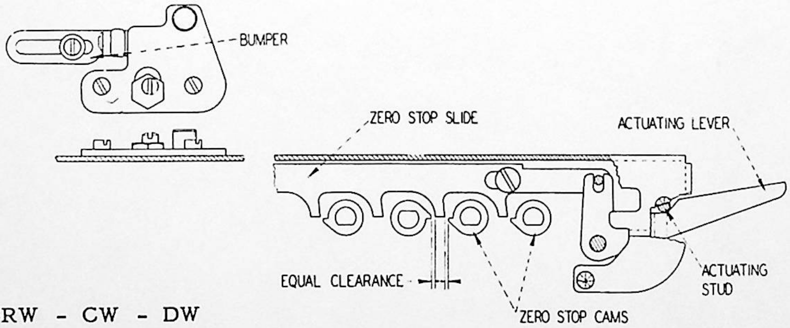


SW

ADJ. 71E KEYBOARD CLEAR DISABLING - MULTIPLIER CLEAR: When the Multiplier Setting Key is in the Multiplier Correction position, the Block Lever is to hold the Clear Link below the Clear Gate. The Disabling Lever may need aligning.

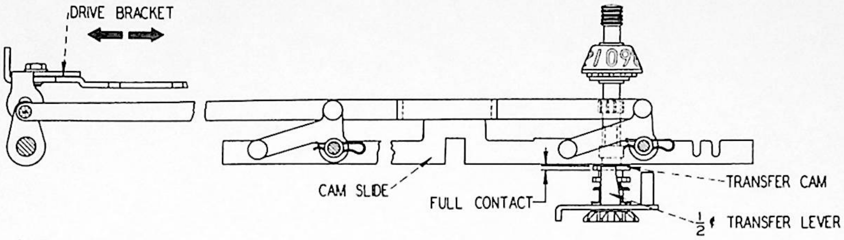
The Lip of the Block Lever, Inset, is to be formed enough to the rear to prevent the Clear Link from slipping off at its extreme rearward travel.

Oil the bearings.



STW - ACG - SRW - CW - DW

ADJ. 72A OPTIONAL CLEAR SLIDE BUMPER - ACG AND COMPLETE TRANSFER: Turn adjacent Dials to a 5 and a Zero. Adjust the Bumper so the Actuating Stud contacts the Actuating Lever and holds the Zero Stop Slide for approximately equal clearance between the Zero Stop Cams. Because the Zero Stop Slide must actuate other parts at the instant the Optional Clear Slide starts moving, the Actuating Lever rests on the Actuating Stud.



STW - ACG - CW - DW

ADJ. 72B CAM SLIDE DRIVE BRACKET: Move the Drive Bracket to the left as far as it will go. This depresses the Cam Slide until the Transfer Cams and the 1/2¢ Transfer Levers have full contact. On a clearing operation, the Cam Slide must raise the Transfer Cam so the 1/2¢ Transfer Lever is not contacted as the Dial is rotated by the Clear Rack. To test: Pull the Optional Clear Slide to the right; turn the 1/2¢ or Fractional Dials to a 5; restore the Slide; turn the same Dials to a 0. Hold thumb on 1/2¢ Transfer Lever and push out on the Optional Clear Slide. If the Transfer Cam contacts the 1/2¢ Transfer Lever, move the Drive Bracket to the right. Re-check Adj. 72A.

Oil the Transfer Cams.

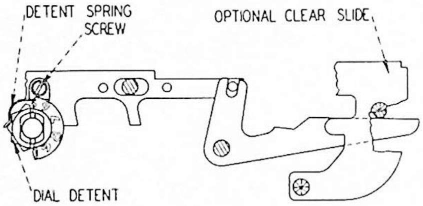


FIG 1

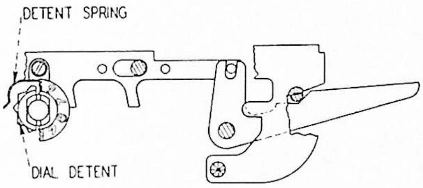


FIG 2

STW - ACG - CW - DW

ADJ. 72C DETENT SPRINGS: Fig. 1. When the Optional Clear Slide is pulled to the right, the Detent Spring is to press into the Dial Detent. Adjust at the Screw. When in Home Position, Fig. 2, the Detent Spring is to clear the Dial Detent.

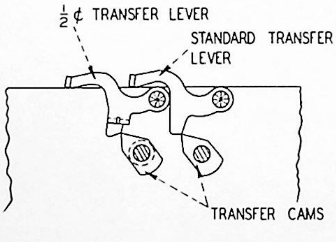


FIG 1

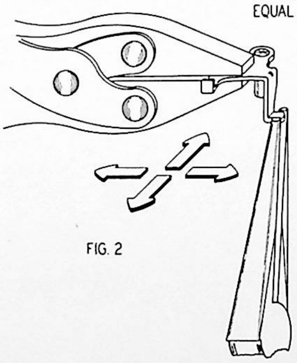


FIG. 2

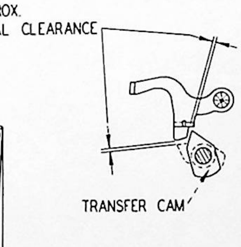
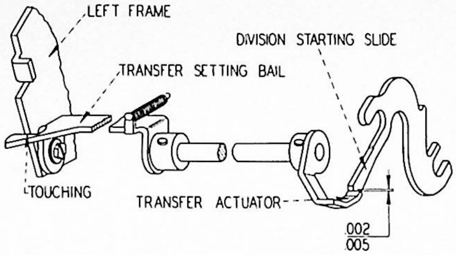


FIG 3

STW - ACG - CW - DW

ADJ. 72D 1/2¢ TRANSFER LEVER: Fig. 1; the 1/2¢ Transfer Lever is to "throw" as far as the Standard Transfer Lever. Check by rotating the Dials until the Transfer Cams are on the high point of movement. If necessary, adjust the 1/2¢ Transfer Lever per Fig. 2 keeping sufficient clearance to the Transfer Cam, Fig. 3, for free up and down movement.

ADJUSTMENTS



STW - ACG

ADJ. 73A TRANSFER ACTUATOR ASSEMBLY FOR DIVISION STARTING SLIDE: When the machine is in Home Position and the Transfer Setting Bail is touching the Left Frame, there should be .002 to .005 clearance between the Division Starting Slide and the Transfer Actuator. To adjust, form the Transfer Actuator.

Oil the bearings.

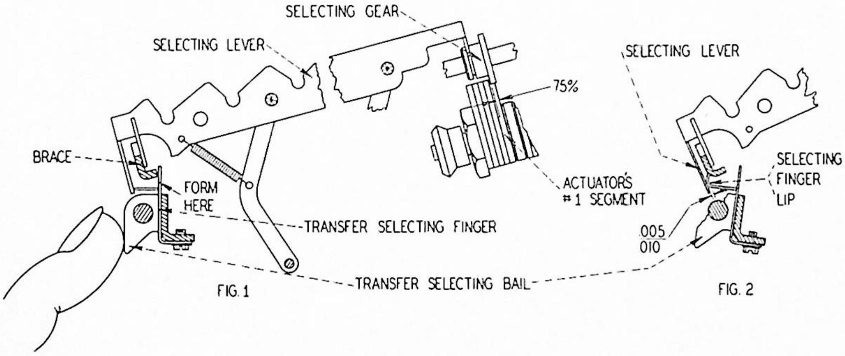


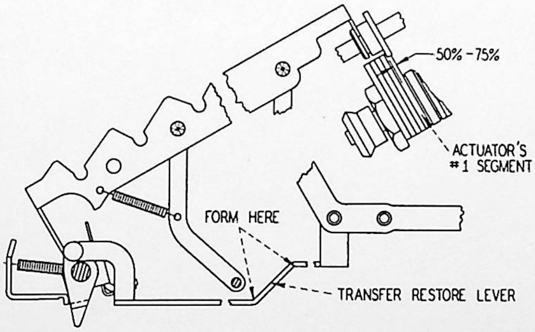
FIG. 1

FIG. 2

STW - ACG

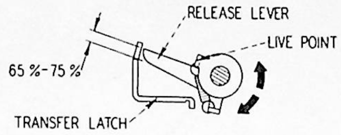
ADJ. 73B TRANSFER SELECTING FINGER: Fig. 1. Pull the Selecting Lever forward by rocking the Transfer Selecting Bail with a finger. The Transfer Selecting Finger is to limit against the Brace thus giving the Selecting Gear a 75% engagement with the Actuators #1 Segment. Form the Transfer Selecting Finger. Fig. 2. When the Transfer Selecting Bail is in neutral position, there should be .005 - .010 clearance between the Selecting Lever and the Selecting Finger Lip. Adjust by forming the Lip to stop against the Brace.

Oil the bearings.



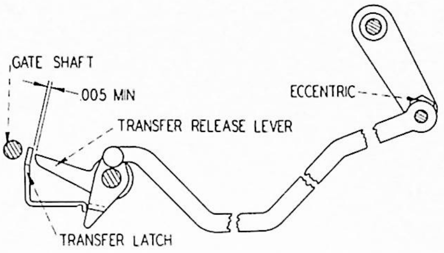
STW - ACG

ADJ. 73C TRANSFER RESTORE LEVER - EARLY STYLE: When the Transfer Keys are depressed and the Drive Shaft is turned 1/4 cycle, the Selecting Gear is to have 50% - 75% engagement with the Actuator's #1 Segment. Form the Transfer Restore Lever at the Offset.



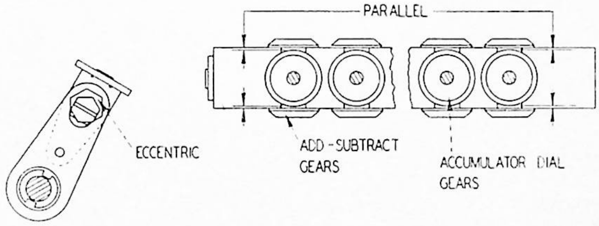
STW - ACG

ADJ. 73D TRANSFER RELEASE LEVER: Adjust the Release Lever by rotating the Live Point to have 65% - 75% latch with the Transfer Latch. Check this by latching the machine in Division and tapping on the Transfer Keys. The Latch should not drop off.



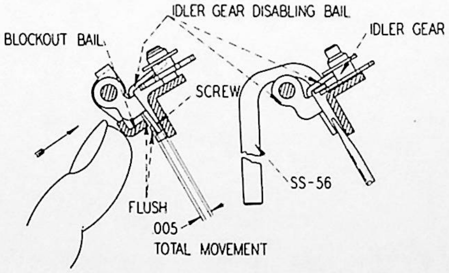
STW - ACG

ADJ. 73E TRANSFER LATCH: In Home Position the Transfer Latch is to have a minimum of .005 clearance to the Transfer Release Lever and is not to contact the Keyboard Clear Gate Shaft. Adjust at the Eccentric. On machines without the Eccentric, adjust by forming the Transfer Latch.



STW - SRW - CW - DW

ADJ. 74A ADD - SUBTRACT GATE ALIGNMENT: Have the Carriage installed. The Add - Subtract Gate should hold the Add - Subtract Gears parallel to the Accumulator Dial Gears. Adjust the Eccentric at the left end of the Add - Subtract Gate.



STW - SRW - CW - DW

ADJ. 74B IDLER GEAR DISABLING BAIL: Press the Blockout Bail inward until the edge is flush with the Screw. Carefully hold in this position and check each Idler Gear Disabling Bail for .005 movement. To adjust each Disabling Bail, insert a screwdriver as illustrated and form with SS-56.

Reason for Adjustment: To insure that each Disabling Bail raises each Idler Gear an equal amount.

Oil the bearings.

ADJUSTMENTS

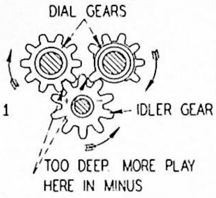
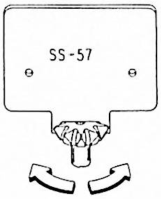


FIG 1



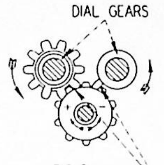
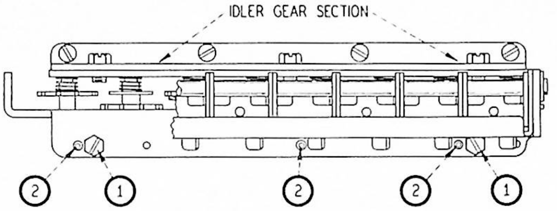


FIG 2

NOT DEEP MORE PLAY HERE IN PLUS



STW - SRW - CW - DW

ADJ. 74C IDLER GEAR SECTION: There should be an equal amount of minimum backlash or play in both Plus and Minus motions. Turn SS-57 in the 12th Accumulator Dial Gear and observe how the dials pick up as the transfer motion progresses from the 12th dial to the 20th (minus) and back (plus). If the Idler Gear Section is in too deep, there will be more delay in pick up between each Dial as they turn in the Minus motion, Fig. 1. If the Idler Gear Section is not deep enough, there will be more delay in pick up between each Dial as they turn in the Plus motion, Fig. 2.

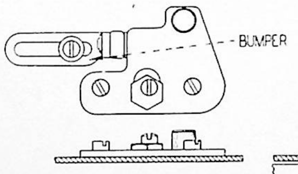
If there is more play in Minus than in Plus, move the Idler Gears to the front by turning Screws 1 out and running Screws 2 in slightly a like amount. Tighten Screws 1 until resistance is felt. Do not force in.

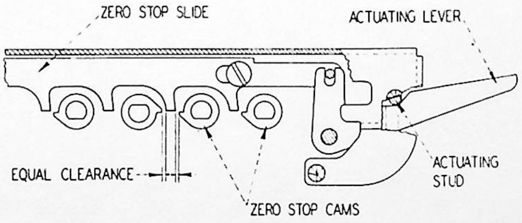
If there is more play in Plus than in Minus, move the Idler Gears to the rear by turning Screws 2 out slightly a like amount and tightening Screws 1 until resistance is felt. Do not force in.

1/12th of a turn may be sufficient. The Idler Gear Section should be as even as possible although one end may need adjusting more to provide an equal backlash or play at the ends.

Reason for Adjustment: To give the Dials an equal control or momentum so they will all turn from Zero to 9 or from 9 to Zero. If they do not have equal control, the Dials at the extreme left end may not turn properly or may turn past the 9 or the Zero.

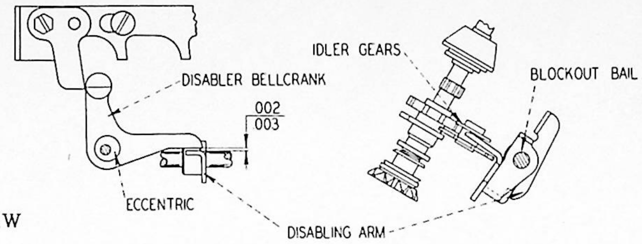
Oil the bearings.





STW - ACG - SRW - CW - DW

ADJ. 74D OPTIONAL CLEAR SLIDE BUMPER - ACG AND COMPLETE TRANSFER: Turn adjacent Dials to a 5 and a Zero. Adjust the Bumper so the Actuating Stud contacts the Actuating Lever and holds the Zero Stop Slide for approximately equal clearance between the Zero Stop Cams. Because the Zero Stop Slide must actuate other parts at the instant the Optional Clear Slide starts moving, the Actuating Lever rests on the Actuating Stud. (This is the same adjustment as 72A.)



STW - CW - DW - SRW

ADJ. 74E DISABLER BELLCRANK: Pull the Optional Clear Slide all the way to the right. Adjust the Eccentric so that the Disabling Arm moves the Blockout Bail rearward as far as possible without forcing. When the Optional Clear Slide is in Home Position, there should be no pressure of the Disabling Arm against the Disabler Bellcrank. A .002 to .003 clearance is preferable. A greater Gap may delay the disengaging action. To check, put all 9's into the Carriage and clear by hand. The Idler Gears are to raise before the Dials rotate.

Oil the bearings.

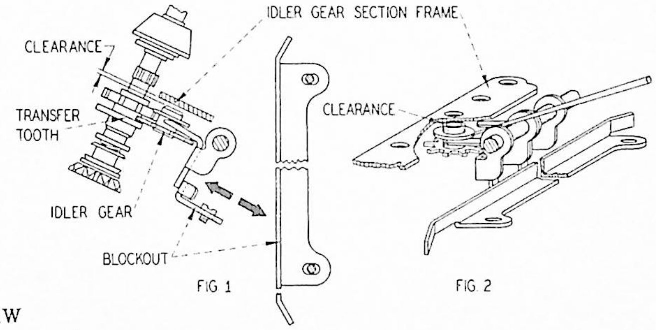
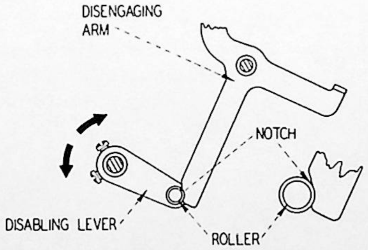


FIG 1 FIG 2

STW - CW - DW - SRW

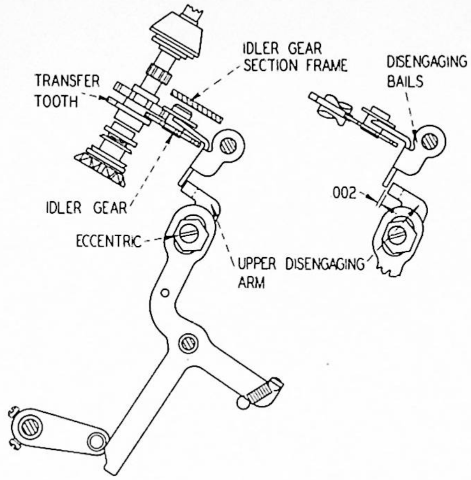
ADJ. 74F BLOCKOUT - IDLER GEAR DISABLING BAIL: When the Carriage is in the extreme right Position, each Idler Gear is to be disengaged from its Transfer Tooth. The rear Carriage Straps must be adjusted properly to hold the Carriage steady. Place the Carriage in half shift between the last and next to last position and use the Pick Up Test by rotating the Dials by the twirlers from '0' through '9' to '8' and back through '9' to '1'. There should be no attempt to transfer to the next Dial to the left. Any movement to the Dial to the left indicates the Idler Gears are not held high enough. Adjust the Blockout, Fig. 1, keeping it level, to raise the Idler Gears above the Transfer Tooth. If the Idler Gears are raised too high they will bind against the Idler Gear Section Frame. Test for this by inserting a spring hook, Fig. 2, and feeling for small clearance by raising the Idler Gear.



STW - CW - DW - SRW

ADJ. 74G DISENGAGING ARM: When the machine is in Home Position, the Roller is to set in the notch of the Disengaging Arm without moving the Arm. Adjust the Disabling Lever.

Oil the Roller.



STW - CW - DW - SRW

ADJ. 74H UPPER DISENGAGING ARM: When the Division Key is depressed and the Drive Shaft is cycled three times, the Upper Disengaging Arm should cause the Idler Gear to raise well above the Transfer Tooth but not to be jammed tight into the Idler Gear Section Frame. This would cause a bind in the Dials or the Carriage movement. Adjust at the Eccentric. In Home Position there should be a minimum of .002 clearance between the Arm and the Disabling Bails.

Reason for Adjustment: To raise the Idler Gear above the Transfer Tooth during Division. If the Idler Gear is not being held high enouth, the Dial is line with the 12th order will attempt to transfer to the 13th order on overdraft and restore.

Oil the bearings.

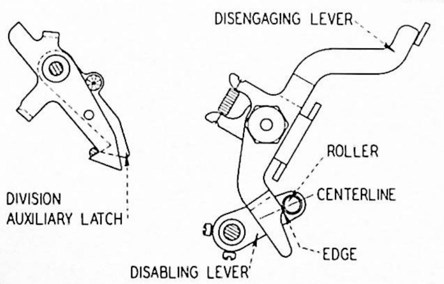


FIG 1

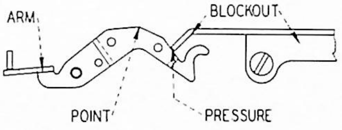
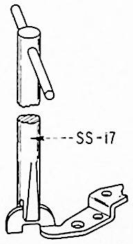


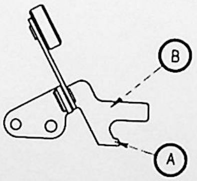
FIG 2



STW - CW - DW - SRW

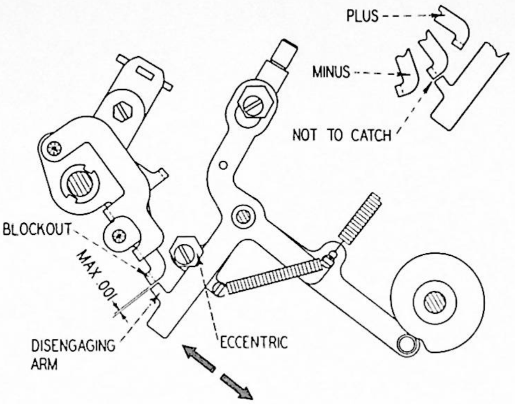
ADJ. 74J DISENGAGING LEVER - COMPLETE TRANSFER: Step 1, Fig. 1. Have the Carriage off, depress the Division Keys and cycle the Drive Shaft until the Division Auxiliary Latch is delatched. Adjust the Disabling Lever until the Center Line of the Roller is slightly above the Edge of the Disengaging Lever. Step 2, Fig. 2. While the machine is still in Division, form the Disengaging Arm so it is pressing against the Blockout. This pressure will cause a slight movement of the Blockout, and is necessary to insure that the Disengaging Arm will properly raise the Idler Gears. This prevents a transfer to the left of the position being disabled during Division. The Point of the Disengaging Arm is to be even with or above the surface of the Blockout.

Oil bearings.



STW - CW - DW - SRW

ADJ. 74K BELL TAPPER: To adjust for proper ringing action when making an overdraft, form Tail A. To adjust the Bell not to ring in Division, form Tail B.

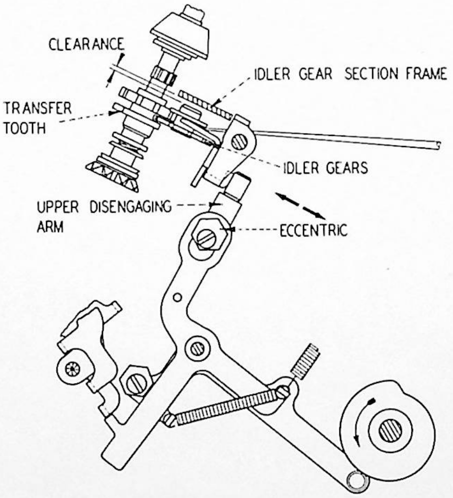


STW - CW - DW

ADJ. 75A DISENGAGING ARM - EARLY STYLE COMPLETE TRANSFER: When the Carriage is to the extreme left and the machine is in Home Position, there should be a very close clearance between the Disengaging Arm and the Blockout, approximately .001. The Blockout should not catch on the Disengaging Arm when the Add - Subtract Gate is moved manually from Plus to Minus. Adjust at the Eccentric.

Reason for Adjustment: Excessive clearance at this point will allow the Idler Gears to lower during Carriage Clear. This could cause a lock up between the Idler Gears and the Transfer Teeth or cause the tops of the Transfer teeth to become worn. Too close would prevent the Blockout from positioning after a Plus - Minus Operation.

Oil the bearings.



STW - CW - DW

ADJ. 75B UPPER DISENGAGING ARM - EARLY STYLE COMPLETE TRANSFER: Place the Carriage to the extreme left, release the Clutch and cycle the Drive Shaft one half turn. The Idler Gears are to be held above their Transfer Tooth but are not to be tight against the Idler Gear Section Frame. Adjust the Eccentric to raise or lower the Idler Gears. The rear carriage straps must be adjusted properly to hold the Carriage steady. Use the Pick Up Test by rotating the Dials by the twirlers from "0" through "9" to "8" and back through "9" to "1". There should be no attempt to transfer to the next Dial to the left. Any movement indicates the Idler Gears are not held high enough. If the Idler Gears are raised too high they will bind against the Idler Gear Section Frame. Test for this by inserting a spring hook and feeling for small clearance by raising the Idler Gear.

Oil the bearings.

ADJUSTMENTS

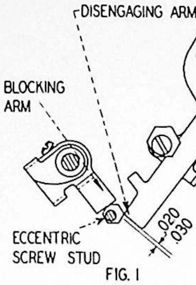


FIG. I

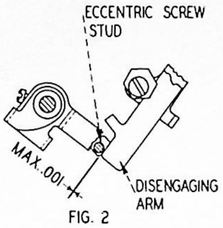
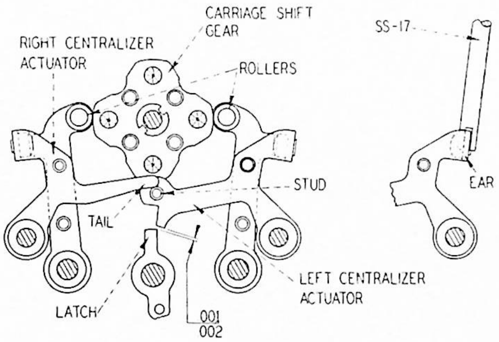


FIG. 2

STW - CW - DW

ADJ. 75C BLOCKOUT FOR DIVISION - EARLY STYLE COMPLETE TRANSFER: Fig. 1. When the machine is in Home Position, the Eccentric Screw Stud is to clear the Disengaging Arm by .020 - .030. Adjust by moving the Blocking Arm. When the machine is latched in Division, the Eccentric Screw Stud, Fig. 2, is to clear the Disengaging Arm by a maximum of .001. Adjust the Eccentric Screw Stud.

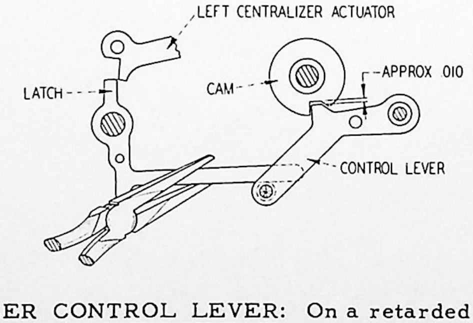
Reason for Adjustment: A wide clearance of Fig. 2 may allow the Idler Gears to engage with the Transfer Teeth during the overdraft or restore cycle.



STW

ADJ. 76A SHIFT GEAR CENTRALIZERS: Rotate the Carriage Shift Gear until the Rollers on the Centralizer Arms are in the position illustrated. The Left Centralizer Actuator is to have approximately .001 - .002 clearance to the Latch. Form the ear of the Left Centralizer Actuator to obtain this clearance, and form the ear of the Right Centralizer Actuator so its tail is not raised by the Stud of the Left Actuator.

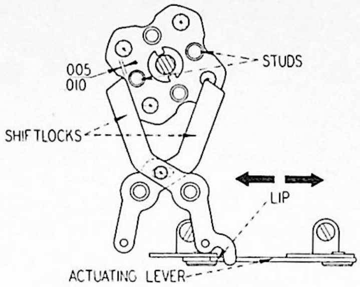
Oil the bearings.



STW

ADJ. 76B SHIFT CENTRALIZER CONTROL LEVER: On a retarded release of the Shift Keys, the Control Lever is to be approximately .010 from bottoming in the Cam when the Latch releases the Left Centralizer Actuator. Form the Tail of the Latch.

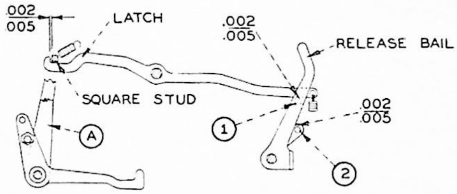
Grease the Cam.



STW

ADJ. 76C SHIFT LOCKS: The Shift Locks should clear the Studs on the Carriage Shift Gear by .005 to .010 in both shifts. Adjust by forming the Lip on the Actuating Lever.

Oil all bearings.



STW

FIG. 1

ADJ. 76D AUTOMATIC CARRIAGE SHIFT CONTROL: Step 1, Fig. 1. Select several "0" in the Unit, depress the Multiplier Key and rotate the Drive Shaft by hand until the Carriage is in a half Shift. The Square Stud is to overlatch with minimum clearance to the Latch. Twist Arm A. Step 2, Fig. 1. While the Carriage is still in half shift, the rear of the Latch is to clear Stud 1 by .002 - .005. Form the Latch up or down. Step 3, Fig. 1. While the Carriage is still in half shift, form the Bail for .002 - .005 clearance between Stud 2 and the Release Bail.

Oil the bearings.

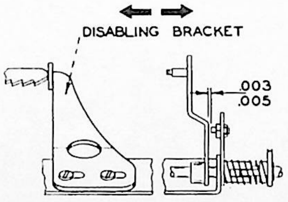


FIG. 2

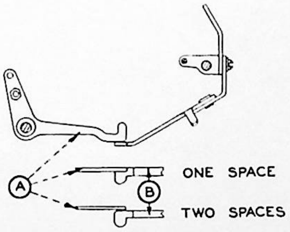


FIG. 3

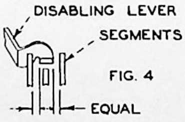


FIG. 4

STW

ADJ. 76E AUTOMATIC CARRIAGE SHIFT CONTROL - FOUR POINT SHIFT: Step 4, Fig. 2. Space the Unit one position, pull the Repeat Key forward and multiply out. Adjust the Shift Disabling Bracket to obtain .003 - .005 as illustrated. Step 5, Fig. 3. Clear out the Repeat Mult. Space the Unit one position. Arm A is to have full engagement with Arm B. Form Arm A. When the Unit is spaced two positions, Arm A is to clear Arm B. Step 6, Fig. 4. Select "01" in the Unit. The Disabling Lever is to be centered between the Segments. Check in all positions. Form the Disabling Lever. Also the Segments, if necessary.

Oil the bearings.

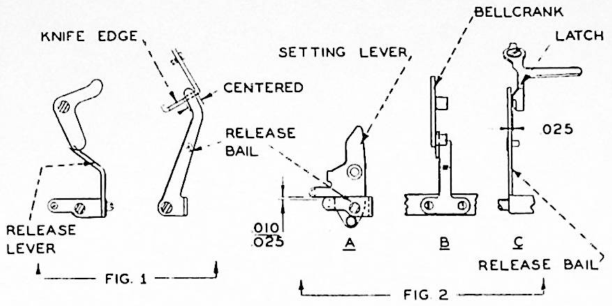


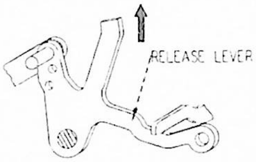
FIG. 1

FIG 2

STW

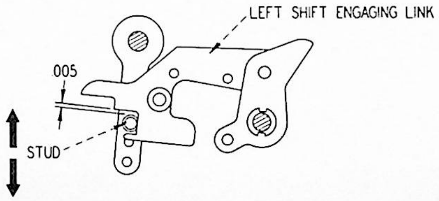
ADJ. 76F LATCH RELEASE BAILS: Step 1, Fig. 1. When the Shift Gear is half turned, the upper end of the Release Bail is to be centered between the knife edge of the Latch and the rear of the Latch. Form the Release Lever. Step 2, Fig. 2. When the machine is in Home Position, the Release Bail is to clear the knife edge of the Latch by .025, Fig. 2C. Push the Bail forward to check. Adjust by having the Release Lever against the Setting Lever, Fig. 2A, and moving the Release Bail for the clearance, then position the Release Lever against the Bellcrank, Fig. 2B, to remove the end play from the assembly, yet have it free. Step 3, Fig. 2A. The Stud on the Release Bail is to clear the Setting Lever approximately .010 - .025. Twist the Release Bail.

Oil all bearings.



STW

ADJ. 76G TABULATOR KEY RELEASE LEVER: When none of the Tab stops on the Carriage Rail are depressed, the Enter Dividend Key is to restore on the first override cycle when the Carriage reaches the extreme right position. If the Key fails to release, form the Release Lever upward.



ST - S

ADJ. 77 LEFT SHIFT DISABLING - MULT. CORR. - GRAY LINE: Depress the Mult. Correction Key and form the Stud for .005 clearance to the Left Shift Engaging Link.

Reason for Adjustment: On early multiplier models which had a "walking beam" interlock between the Mult. Key and the Mult. Corr. Key, the Left Shift Engaging Link could be raised above the Stud. This could occur on a simultaneous depression of the Mult. Key and Mult. Corr. Key, and could result in the Mult. Key latching and the machine cycling without performing a Mult. operation.

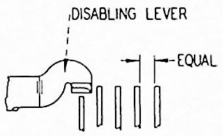


FIG 1

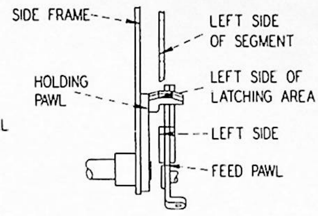


FIG 2

ST - S

ADJ. 78 FEED PAWL AND DISABLING LEVER - GRAY LINE: Step 1, Fig. 2. Align the Holding Pawl parallel with the Side Frame. Step 2, align the Feed Pawl so its left side is in line with the left side of the Holding Pawl Latching Area. Step 3, Fig. 1. Align all Segments for equal spacing at top. Enter one figure into the Unit, manually depress the Disabling Lever and escape the Unit by depressing the Zero Key. The Segment will position against the Disabling Lever. Adjust the Disabling Lever to the right or the left to position the left side of the Segment to the left side of the Feed Pawl.

Reason for Adjustment: To feed out the Segment should the Mult. Unit drop back against the Disabling Lever.

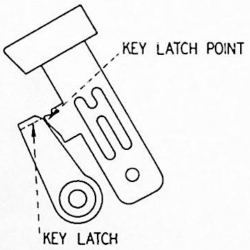


FIG. 1

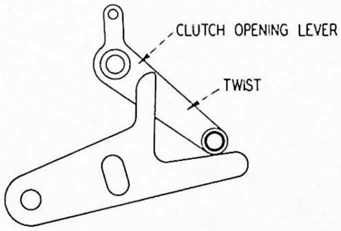


FIG. 2

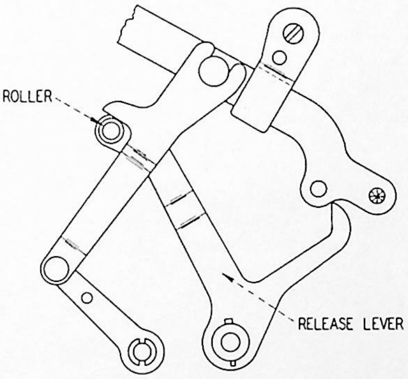
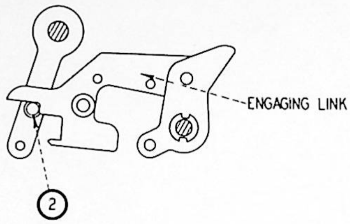
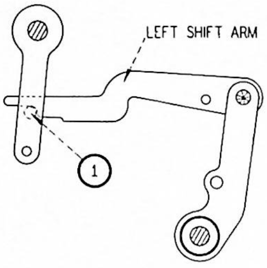


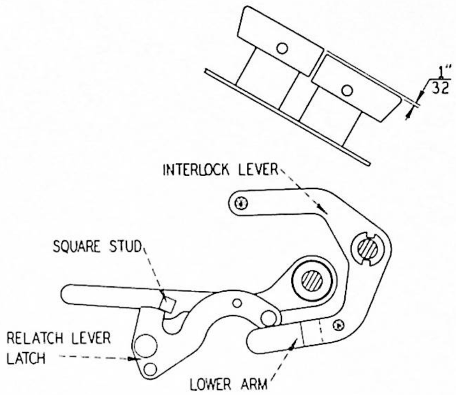
FIG. 3

ST - S

ADJ. 79 CLUTCH RELEASING - GRAY LINE MULTIPLIER KEYS: Fig. 1. The Clutch is to release slightly before the Key Latch slips over the Key Latch Point of the Multiplier, the Accumulative Mult., and the Negative Mult. Keys. Fig. 2. For the Mult. Key, twist the Clutch Opening Lever. Fig. 3. For the Accum. and Neg. Keys, form the Release Lever to change the position of the Roller.



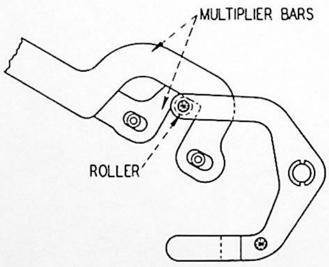


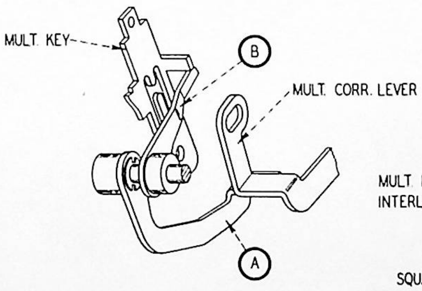


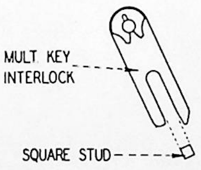
ST - S

ADJ. 80 LEFT SHIFT ENGAGING LINK RESTORE - GRAY LINE: Step 1. Have the Unit in Home Position and depress the Accumulative Mult. Key, hold it down then release it slowly. The Square Stud should remain on top of the Relatch Lever Latch until the Key is 1/32" or less from reaching its top travel. Before the Square Stud drops off, the Left Shift Arm should be restored onto Stud 1. Form Lower Arm of the Interlock Lever to control the Square Stud dropping. The Arm of Stud 1 may need twisting to position the Stud to the rear if full control cannot be gained at the Interlock Lever. The Square Stud must be off the Relatch Lever Latch before the Key is restored. Step 2, Repeat the above operation with the Mult. Key. The Square Stud should remain on top of the Relatch Lever Latch until the Engaging Link has restored onto Stud 2. Check the adjustment at the Lower Arm, however, before adjusting check Adj. 27A for clearance of the Clip to the Shift Fork. Correct this first.

Reason for Adjustment: If the Keys are depressed - held - and then restored enough to allow the Square Stud to drop off, then re-depressed before the Engaging Link or Arm is engaged with its Stud, the machine will cycle without a multiplication. This adjustment prevents this occurrence.

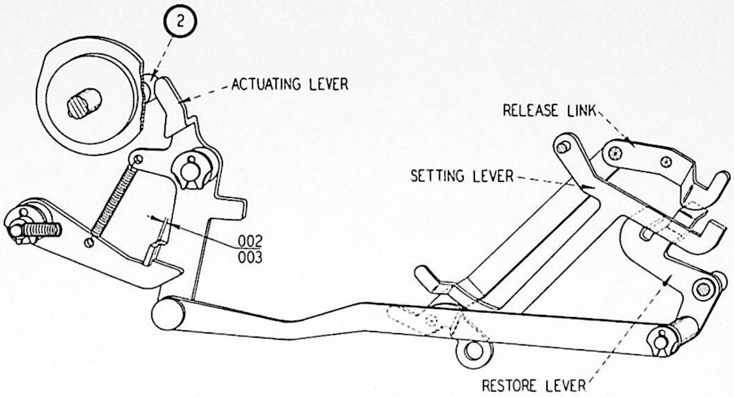






ST - S

ADJ. 81 INTERLOCK LEVERS - GRAY LINE: When the Roller is held against the Multiplier Bars and Arm A is against the Mult. Corr. Lever and Arm B is against the Mult. Key, the Mult. Key Interlock, when depressed, is to straddle the Square Stud. Form Arms A or B to align the Interlock.



ST - S

ADJ. 82 MULTIPLIER SETTING RESTORE LEVER - GRAY LINE: Operate the machine in Multiplication. When Roller 2 and the Actuating Lever are at the point of maximum movement, there is to be .002 - .003 overlatch as illustrated. Adjust by forming the Actuating Lever. When the Actuating Lever is latched, the Restore Lever is to be snug but not binding against the Setting Levers and the Release Link. Form the Restore Lever Arms.

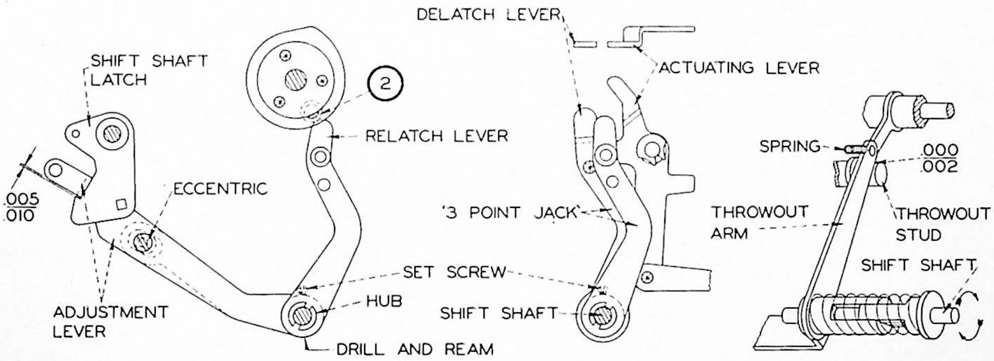


FIG. 1 FIG. 2 FIG. 3

ST - S

ADJ. 83A REPLACEMENT OF MULTIPLICATION CARRIAGE SHIFT SHAFT - GRAY LINE: When a Carriage Shift Shaft needs installing, all new parts should be used. Step 1, Fig. 1. Have the Set Screw loose, position Roller 2 and the Relatch Lever at the point of maximum movement. Adjust the Eccentric for .005 - .010 overlatch of the Adjustment Lever to the Shift Shaft Latch. Step 2, Fig. 2. Position the Shift Shaft to the right as far as possible. Position the "3 Point Jack" so the Delatch Lever is in line with the Actuating Lever. Snug up the Set Screw. Step 3, Fig. 3. Escape the Unit two or more positions. Adjust the Throwout Arm for .000 - .002 clearance to the Throwout Stud, by rotating the Shift Shaft. Have the Spring attached. Tighten the Set Screw. Step 4. Drill the Hub of the "3 Point Jack". Fig. 1, with Drill #49, ream with a 5/0 reamer and use a 7030 taper pin.

NOTE: Never change the adjustment of the Eccentric unless Adj. 83B and Adj. 66C are checked. The Eccentric adjustment holds these two in position.

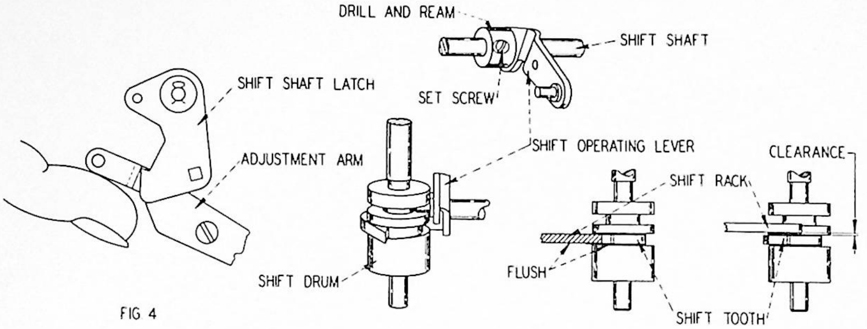


FIG 4 FIG. 5 FIG. 6 FIG. 7

ST - S

ADJ. 83B SHIFT SHAFT OPERATING LEVER - GRAY LINE: (Installation of Shift Shaft continued.) Manually trip the Shift Shaft Latch, Fig. 4. Hold the Shift Shaft to the right and position the Shift Operating Lever, Fig. 5, against the Shift Drum, keeping it straight. Raise the Shift Operating Lever so the underside of the Shift Tooth, Fig. 6, is flush with underside of the Shift Rack. Tighten the Set Screw. Relatch the Adjustment Arm. Depress the Mult. Corr. Key and press down on the Shift Rack while rotating the Drive Shaft. The Shift Tooth is not to contact the Shift Rack, Fig. 7. Drill with a #52 Drill, ream with a 6/0 reamer and use a 7033 taper pin. Recheck Adj. 83A after installation is completed. When drilling, set the drill to run through at a slight angle to miss the head of the Set Screw.

After this adjustment is made, check Adj. 66C.

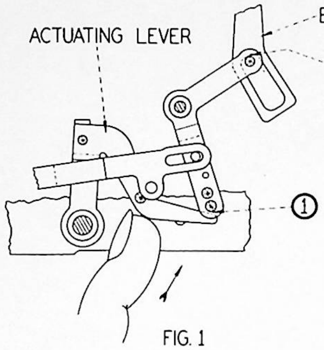


FIG. 1

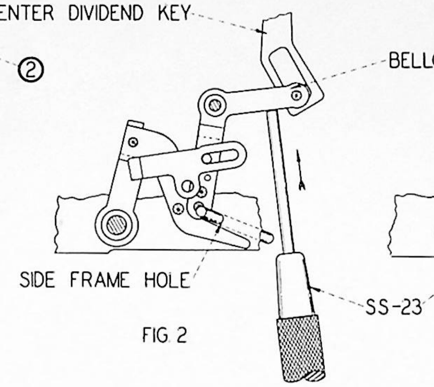


FIG 2

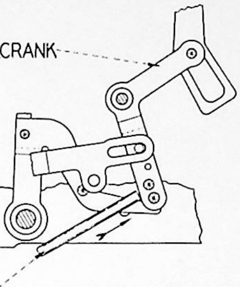


FIG. 3

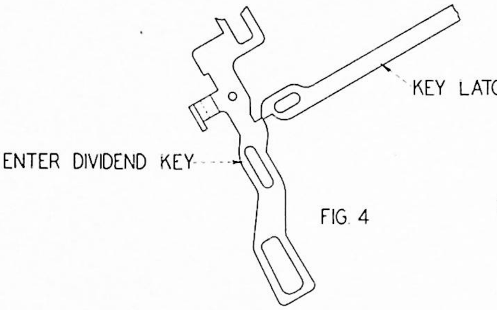


FIG. 4

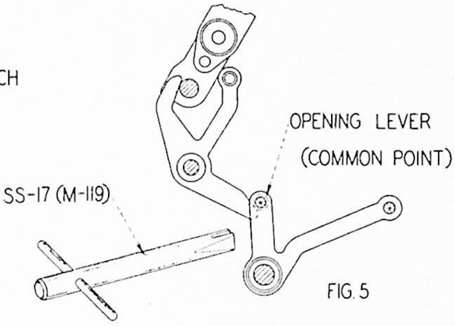


FIG. 5

STW - ACG - SW - CW - DW - SRW

ADJ. 84A CLUTCH RELEASING - ENTER DIVIDEND: The Clutch Releasing is controlled at the Common Point, Fig. 5, however, before making any adjustment test for play between Points 1 and 2, Fig. 1. Hold the Actuating Lever upward and press lightly on the Enter Dividend Key. Points 1 and 2 should touch lightly. TO REMOVE PLAY: Position Bellcrank, Fig. 2, by manually pulling it down. Insert a suitable shaft in the Side Frame Hole and tap upward with SS-23, Fig. 2. TO REMOVE PRESSURE: Tap on Bellcrank with SS-23, Fig. 3. Do not form the Actuating Lever.

COMMON POINT ADJUSTMENT. Fig. 5. If the above is correct, adjust the Clutch Releasing to occur slightly before the Key Latch slips into place, Fig. 4. Adjust by twisting the Opening Lever with SS-17 (M-119). On some machines the Clutch Releasing and Key Latching can be at the same time without causing a rattle of the main Clutch. Whenever the Opening Lever is adjusted always check Adjustments 30 and 40F.

Oil all bearings.

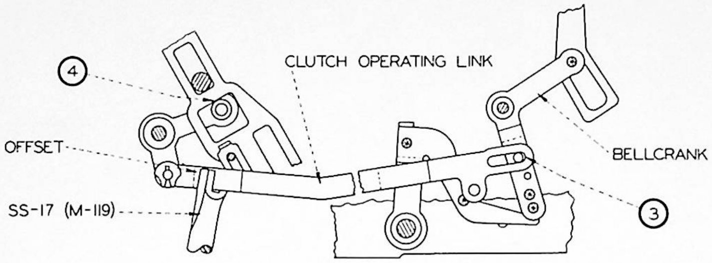


FIG. 1

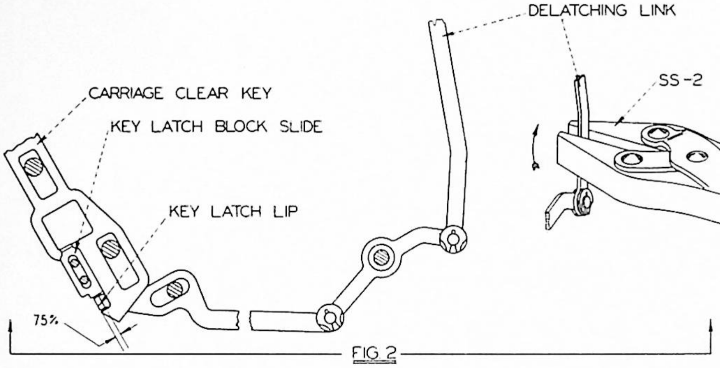


FIG 2

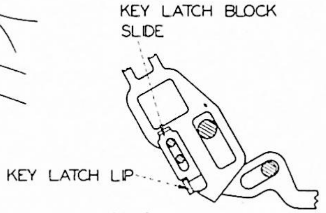
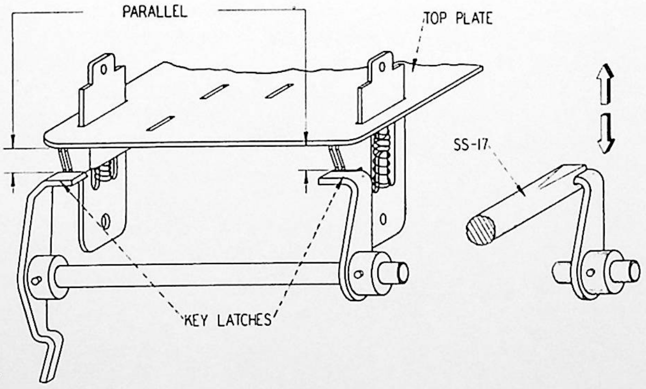


FIG. 3

STW - ACG - CW - DW - SRW

ADJ. 84B CLUTCH RELEASING AND KEY LATCHING - CARRIAGE CLEAR: Fig. 1. To obtain a simultaneous Clutch Releasing and Key Latching, shorten or lengthen the Clutch Operating Link at the Offset by twisting with T-Forming Tool SS-17. After forming, test for freeness of the Link. NOTE: Do not shorten the Link to the extent that it pulls on the Bellcrank. On some machines a simultaneous Clutch Releasing and Key Latching cannot be obtained; the Clutch will release earlier. For these machines, adjust the Link for a slight amount of play between Points 3 and 4. Fig. 2. The Key Latch Lip should have at least 75% engagement with the Carriage Clear Key when in the latched position. Form the Delatching Link by twisting with Pliers SS-2 in the direction of the arrow for more engagement. If the Carriage Clear Key is held depressed, the Key Latch Block Slide should remain on top of the Key Latch Lip until the Clear action is completed and then should drop behind the Key Latch Lip. Fig. 3. When the Division Stop Lever is held to the rear, the Key Latch Lip is to clear the Carriage Clear Key.

Oil the bearings.



STW - ACG - SW - SRW

ADJ. 84C MULTIPLIER KEY LATCHES: Form the Key Latches so they are parallel with the Top Plate. The position of the Key Latches determine how much the Mult. Keys will be held down, therefore, the Key Latches should not be changed after the following adjustments are made.

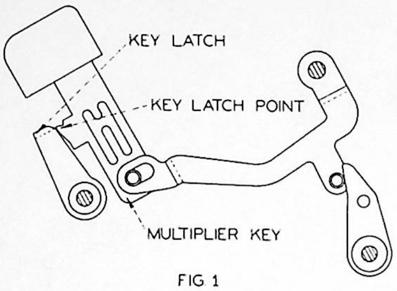


FIG 1

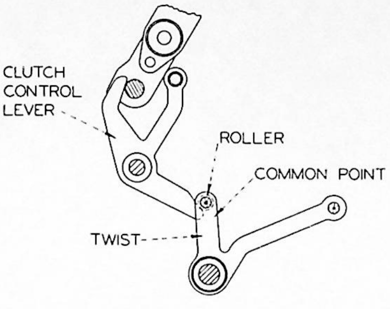


FIG 2

STW-10	530127
STW-8	335520
SW-10	914644
SW-8	713545
SRW-10	876573
ACG-10	530113

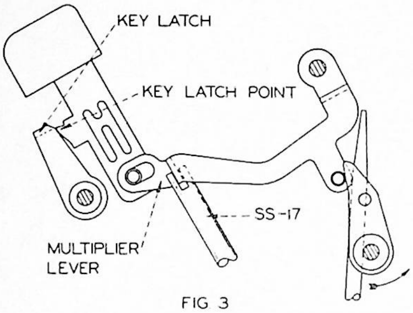


FIG 3

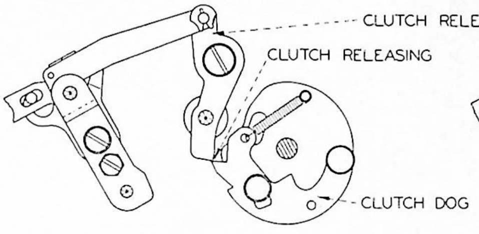


FIG 4

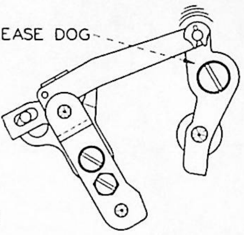


FIG 5

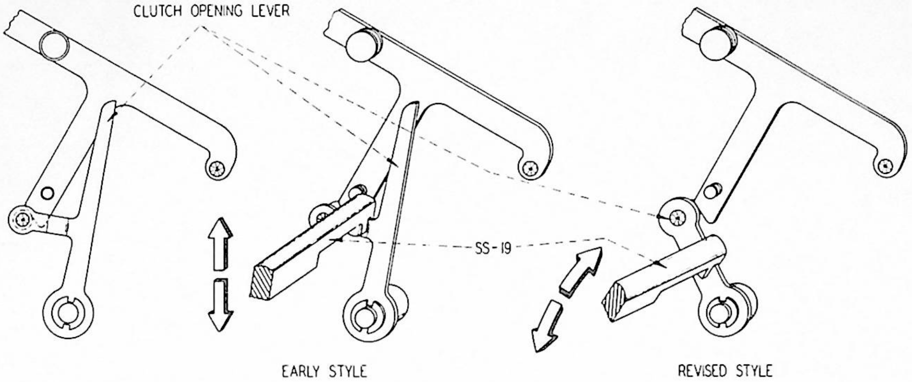
STW - ACG - SW - SRW

ADJ. 84D CLUTCH RELEASING - MULTIPLIER KEY: The Clutch Releasing on machines prior to the serial numbers in the Inset is controlled at the Common Point, Fig. 2. The Clutch releasing is to occur slightly before the Key Latch engages the Key Latch Point, Fig. 1. This may cause the Clutch Release Dog to shake during the Drive Shaft cycling, Fig. 5. This shake is permissible to the extent that there is no rattle of the Clutch Release Dog.

Early Clutch Releasing: Delay by twisting the Common Point to move the Roller away from the Clutch Control Lever.
Late Clutch Releasing - (rattle): Increase by twisting the Common Point to move the Roller against the Clutch Control Lever.
Whenever the Common Point is adjusted always recheck Adj. 30 and Adj. 40F.

The Clutch releasing on machines above the serial numbers shown can be adjusted so the Clutch releases, Fig. 4, as the Key Latch slips over the Key Latch Point, Fig. 3. This delay is possible because the Clutch Dog has veen revised to provide a delayed Clutch Releasing. On machines equipped with this Clutch there will be no rattle during the Drive Shaft Cycling. Before adjusting, check Adj. 84A and Adj. 84B for the setting of the Common Point, then control the Multiplier Key Clutch Releasing by adjusting the Multiplier Lever.

Early Clutch Releasing: Delay by inserting a screwdriver as illustrated, Fig. 3, and moving it in the direction of the arrow.
Late Clutch Releasing - Key Latched and Clutch not Released: Increase by twisting with SS-17 at the Offset.



STW - ACG - SRW

ADJ. 84E CLUTCH RELEASING - ACCUM. - NEG.: Twist the Arm of the Clutch Opening Lever to obtain a simultaneous Clutch Releasing and Key latching of the Accumulative Key on machines above the Serial numbers shown on Adj. 84D. The Clutch Releasing on the Negative Key may be slightly ahead of the Accumulative Key Latching after the Accumulative Key adjustment. On machines prior to the serial numbers given in Adj. 84D, delay the Clutch releasing as much as possible without getting a Clutch rattle.

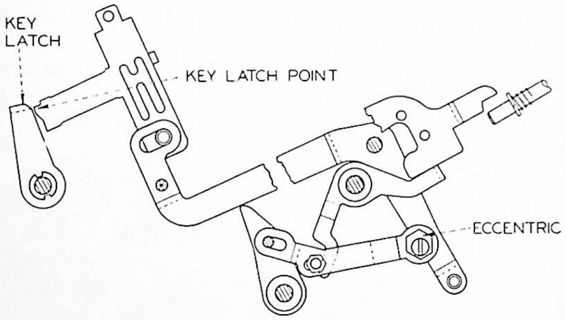


FIG 1

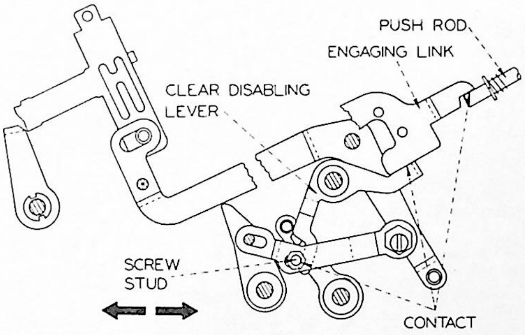
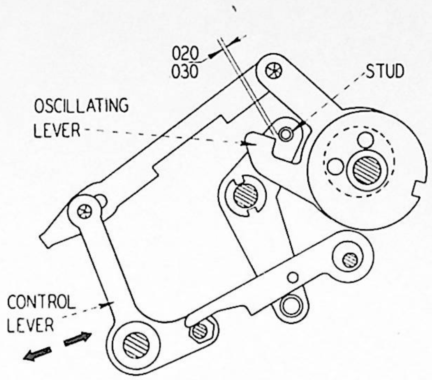


FIG 2

STW - ACG - SRW

ADJ. 84F CLUTCH RELEASING - MULTIPLIER CORRECTION: Step 1, Fig. 1. The Clutch should release as the Key Latch engages the Key Latch Point. Adjust the Eccentric. A simultaneous Key Latching and Clutch Releasing can be obtained on machines above the serial number per Adj. 84D. A clutch vibration is permissible on machines below these serial numbers. Step 2, Fig. 2. When the machine is in Home Position, the Clear Disabling Lever is to contact the Screw Stud and the Engaging Link without holding the Engaging Link away from the Push Rod. Slide the Screw Stud front or rear.

Oil the bearings.



STW - ACG - SW - CW - DW - SRW

ADJ. 84G POWER SHIFT - INITIAL POSITIONING OF OSCILLATING LEVER: Depress the Plus Key, rotate the Drive Shaft by hand crank until the Oscillating Lever is at its closest position to the Stud. Measure for .020 to .030 clearance. Adjust by forming the Control Lever. (By removing the Keyboard, the Control Lever can be reached.)

Reason for Adjustment: This positions the Oscillating Lever for proper engagement with the Stud when the Operating Keys are depressed and the Drive Shaft rotates.

Oil the bearings.

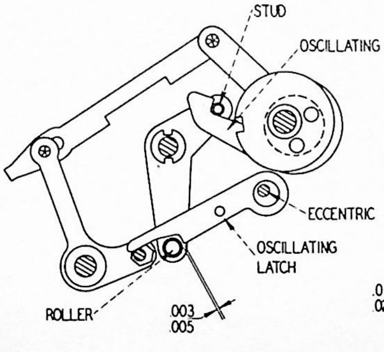


FIG.1

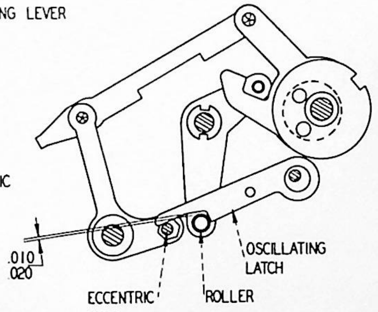


FIG.2

STW - ACG - SW - CW - DW - SRW

ADJ. 84H POWER SHIFT - ADJUSTMENT OF OSCILLATING LEVER: Fig. 1. Test the overthrow of the Roller to Oscillating Latch by depressing each Control Key (Enter Div'd, Carriage Clear, all Multiplier Keys) and rotating the Drive Shaft by hand crank until the Oscillating Lever is on the high point of the Stud. Adjust the Eccentric with high side down to give .003 to .005 overlatch of the Oscillating Latch to the Roller on the Operating Key which causes the least movement of the Roller. Fig. 2. With the Roller resting on the Oscillating Latch, adjust the Eccentric Stud to give .010 to .020 clearance as shown. (This clearance is for the revised Oscillating Latch, shown above. The obsolete style Latch clearance is .000 to .010, however, the revised Oscillating Latch should be installed.)

Reason for Adjustment: To insure the holding of the Roller thus keeping all parts in position that are actuated by the action of the Oscillating Lever.

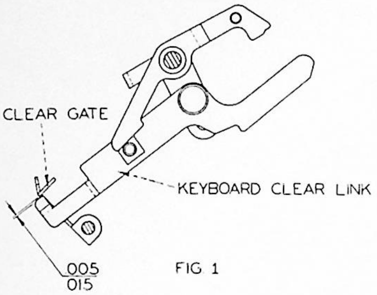


FIG 1

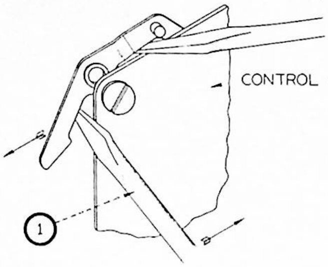


FIG 2

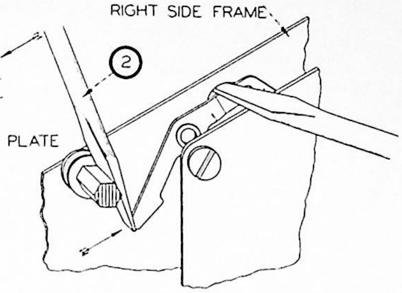


FIG 3

STW - ACG - SW - SRW - CW - DW

ADJ. 84J KEYBOARD CLEAR LINK: Fig. 1. Check the clearance of the Keyboard Clear Link to the Clear Gate. With the Add Key down, cycle the machine by hand in these operations: Multiplication, Enter Dividend, Carriage Clear. The Clear Link should move under the Clear Gate by .005 to .015 on the operating Keys that depress the Clear Link the least. To decrease the clearance: Insert two screwdrivers per Fig. 2 and move Screwdriver 1 in the direction of the arrows. To increase the clearance. Insert two screwdrivers per Fig. 3 and move Screwdriver 2 in the direction of the arrows.

Reason for Adjustment: To insure the Keyboard will be cleared. Too wide a clearance will cause the Clear Link to miss the Clear Gate. Too little, will cause the Clear Link to flick the Clear Gate and clear the Keyboard prematurely.

Oil the bearings.

FRIDEN CALCULATING MACHINE TEST

COMPLETE TRANSFER

To perform Detent and Pickup checks shift carriage to the last position. Turning Shift Gear By hand, position carriage half way between last position and next-to-last position.

DETENT CHECK: Turn Dials slightly out of centralized position and release to see that they return to center of detent. Failure to centralize easily may indicate Idler Gears are being held too high by Disengaging Mechanism. Also look for binds in Sensing Fingers and Dial Bearings. See Adj. 74H.

PICKUP CHECK: Turn Dials backwards from 0 through 9 to 8 and back through 9 to 1. Do this several times. No flicker or attempt to transfer to the next dial to the left should be seen. A movement in the next dial to the left indicates Idler Gears are not being held high enough by the Disengaging Mechanism.

1. Make Pickup Check. If dials try to transfer, the Idler Gears are not being held high enough. See Adj. 74F, 75B.

2. Try transferring Minus and Plus in all Carriage Positions with a 1 in the first column of the Main Keyboard. If any dials tend to spin or not transfer correctly, first check Carriage Adjustments and Geneva Clearances, and in particular, #12 Geneva. Do not attempt any adjustment to the Idler Gear Section until all other adjustments have been corrected. See Adj. 74C.

3. Transfer 9's into Carriage and clear under power. If trouble develops here, see Adj. 74D, 74E, 75A, 75B.

4. Transfer 9's in and out of Carriage using Negative Mult. followed by Accumulative Mult. under power. Do this a number of times.

5. Try Division with a 1 in the first column of the Main Keyboard. Shift Carriage to extreme right and Divide across. If Dials to the left of the blockout point tend to flicker or attempt to transfer, see Adj. 74G, 74H, 75C.

NOTE: The following adjustments also affect Complete Transfer. #12 Geneva should be checked for clearance to the Cam on #6 Actuator. Keep adjustment close, not over .002 to .003 clearance.

Carriage Shift Rack adjustment should be kept close for perfect mesh of Add-Subtract Gears with Product Dial Gears. A little to the right or left may affect Complete Transfer Action.

A loose Carriage affects Complete Transfer.

To check the Carriage Shift Rack Adjustment, apply pressure to the Carriage, both to the right and then to the left while transferring 9's in and out of the Accumulator Dials. Do this in all Carriage Positions. If the Dials tend to falter or fail to transfer properly, the Shift Rack should be adjusted slightly in the direction indicated by this test. That is, if failure is noted when pressing the Carriage to the left, the Shift Rack should be moved slightly to the left to move the Carriage to the right.

FRIDEN CALCULATING MACHINE TEST

This test is to be used with Form 73-7 Calculator Unpacking Inspection Record which is enclosed with each Calculator. When a Friden Calculator is received from the Factory, it should be tested by a qualified member of the Service Department. Discrepancies that are found are to be recorded under the proper Item on Form 73-7 which is to be returned to the General Service Department at San Leandro. If no discrepancy is recorded - do not return Form 73-7. Use this test for testing a machine which has been repaired.

ITEM 1 COVERS
Check the condition of the paint, the fit of the covers and check for dents or damage.

ITEM 2 ELECTRICAL
Without a selection in the Keyboard and the Add Key up, depress the Plus Key to close the Micro Switch. Check for the proper operation of the switch and motor.

ITEMS 3-4 MAIN KEYBOARD KEYS & KEYBOARD COLUMN LOCKS
Depress all "9" Keys. Release each "9" Key by slowly depressing each column Clear Key; then follow by depressing all "8" Keys and releasing, all "7" Keys and releasing, etc. Next depress all "9" Keys, pull up all Separate Column Lock Keys; try Keyboard Clear Key; also, try to depress other numeral keys in each column. All columns should remain locked. Clear each column with Separate Column Clear Keys; depress all "1" Keys; clear with Keyboard Clear Key, and all Keys should clear.

ITEMS 5-6 SELECTION & ONE CYCLE ADD
With Add Key down, check to see that all keys release with Plus and Minus Keys. Note: Hold the Plus Key and the Minus Key down for an instant after each operation. The machine should not make more than one revolution. Release the Key slowly and redepress to check for clutch releasing.

KEYBOARD	DEPRESS CARRIAGE CLEAR	UPPER DIALS	LOWER DIALS
9 9 9 9 9 9 9 9 9 9	Plus Bar	9 9 9 9 9 9 9 9 9 9	1
8 8 8 8 8 8 8 8 8 8	'' ''	1 8 8 8 8 8 8 8 8 8 7	2
7 7 7 7 7 7 7 7 7 7	'' ''	2 6 6 6 6 6 6 6 6 6 4	3
6 6 6 6 6 6 6 6 6 6	'' ''	3 3 3 3 3 3 3 3 3 3 0	4
5 5 5 5 5 5 5 5 5 5	'' ''	3 8 8 8 8 8 8 8 8 8 5	5
4 4 4 4 4 4 4 4 4 4	'' ''	4 3 3 3 3 3 3 3 3 2 9	6
3 3 3 3 3 3 3 3 3 3	'' ''	4 6 6 6 6 6 6 6 6 6 2	7
2 2 2 2 2 2 2 2 2 2	'' ''	4 8 8 8 8 8 8 8 8 8 4	8
1 1 1 1 1 1 1 1 1 1	'' ''	4 9 9 9 9 9 9 9 9 9 5	9
1 1 1 1 1 1 1 1 1 1	Minus Bar	4 8 8 8 8 8 8 8 8 8 4	8
2 2 2 2 2 2 2 2 2 2	'' ''	4 6 6 6 6 6 6 6 6 6 2	7
3 3 3 3 3 3 3 3 3 3	'' ''	4 3 3 3 3 3 3 3 3 2 9	6
4 4 4 4 4 4 4 4 4 4	'' ''	3 8 8 8 8 8 8 8 8 8 5	5
5 5 5 5 5 5 5 5 5 5	'' ''	3 3 3 3 3 3 3 3 3 3 0	4
6 6 6 6 6 6 6 6 6 6	'' ''	2 6 6 6 6 6 6 6 6 6 4	3
7 7 7 7 7 7 7 7 7 7	'' ''	1 8 8 8 8 8 8 8 8 8 7	2
8 8 8 8 8 8 8 8 8 8	'' ''	9 9 9 9 9 9 9 9 9 9	1
9 9 9 9 9 9 9 9 9 9	'' ''	0 0 0 0 0 0 0 0 0 0	0

FRIDEN CALCULATING MACHINE TEST

ITEM 7 AUTO. KEYBOARD CLEAR

With Add Key down, check the machine in all operations. The Keyboard should only clear at the completion of every operation except Multiplier Clear. With the Add Key up, the machine should not clear the Keyboard in any operation. The Keyboard should also not clear during any operation when the Add Key is down.

ITEM 8 COUNTER

Make the Multiplication test below by using the Plus and Minus Keys: Check the Lower Dials closely to see that each Lower Dial registers correctly on each stroke. Plus 10X means Plus 10 individual strokes on the Plus Key. Plus or Minus 9X means Plus or Minus 9 times. Do not hold the Plus or Minus Keys down, but make separate strokes strokes.

ADD KEY UP		SET ON KEYBOARD 1123454321	
CARRIAGE POSITION	DEPRESS CARRIAGE CLEAR	UPPER DIALS	LOWER DIALS
1	Plus 10X	11234543210	10
2	" 9X	112345432100	100
3	" 9X	1123454321000	1000
4	" 9X	11234543210000	10000
5	" 9X	112345432100000	100000
6	" 9X	1123454321000000	1000000
7	" 9X	11234543210000000	10000000
8	" 9X	112345432100000000	100000000
9	" 9X	1123454321000000000	1000000000
10	" 9X	11234543210000000000	10000000000
10	Minus 9X	1123454321000000000	1000000000
9	" 9X	112345432100000000	100000000
8	" 9X	11234543210000000	10000000
7	" 9X	1123454321000000	1000000
6	" 9X	112345432100000	100000
5	" 9X	11234543210000	10000
4	" 9X	1123454321000	1000
3	" 9X	112345432100	100
2	" 9X	11234543210	10
1	" 9X	0000000000	00

OTHER COUNTER TESTS

Place a finger at the left end of Counter Shaft and push with some pressure to the right. Depress and hold the Minus Key for a few revolutions, then use the Plus Key. Place a finger at the right end of the Counter Shaft and push with some pressure to the left. Again use the Plus and the Minus Keys. The Counter Dial operated by the #1 Primary finger should not fail to rotate. Shift the Carriage to the second position and repeat the above test. Try the test in all Carriage positions.

(continued)

FRIDEN CALCULATING MACHINE TEST

(Counter Tests continued)
With the Carriage in first position and the Dials clear, depress the Minus Key for placing all 9's in the Counter Dials. Turn the next to last Dial to a #8. Next, for one cycle at a time, rapidly depress the Plus Key then the Minus Key. The Dial to the left of the 8 should show no movement. Turn this 8 to a 9 and move the 8 to the next Dial to the right. Repeat the test with the Plus and Minus Keys. Continue to move the 8 to the right.

Place all 9's in the Counter Dials, have Add Key down and shift the Carriage to the last position. Turn the next to the last dial to an 8. Place a 1 in the first Keyboard column. Depress the Division Keys. Observe, as the machine is Dividing, that the Dial to the left of the 8 shows no movement.

Repeat the test by shifting the Carriage back to the next to last position and moving the 8 to the next Dial to the right and turning the first 8 to a 9. Repeat the Division test. Continue to move the 8 to the right.

ITEM 9 EXTRA TRANSFER

Repeat each operation several times in each Carriage position. Listen for the Bell to ring on both Minus and Plus Operations. Note if the Bell fails to ring in any Carriage position.

ADD KEY UP

KEYBOARD: 1 locked in			
CARRIAGE POSITION	DEPRESS CARRIAGE CLEAR	UPPER DIALS	LOWER DIALS
1	Minus Plus	99999999999999 All Zeros	99999999999 All Zeros
2	Minus Plus	999999999999990 All Zeros	99999999990 All Zeros
3	Minus Plus	9999999999999900 All Zeros	99999999900 All Zeros
4	Minus Plus	99999999999999000 All Zeros	99999999000 All Zeros
5	Minus Plus	999999999999990000 All Zeros	99999990000 All Zeros
6	Minus Plus	9999999999999900000 All Zeros	99999900000 All Zeros
7	Minus Plus	99999999999999000000 All Zeros	99999000000 All Zeros

FRIDEN CALCULATING MACHINE TEST

ITEM 10 FULL CARRY OVER

Make the following test and see that the Transfer is complete in all Carriage Positions.

SET 1 on KEYBOARD, LOCK IN

MULTIPLIER KEYBOARD	DEPRESS	UPPER DIALS	LOWER DIALS
1	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999999999 All Zeros	99999999999 All Zeros
10	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999999990 All Zeros	99999999990 All Zeros
100	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999999900 All Zeros	99999999900 All Zeros
1000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999999000 All Zeros	99999999000 All Zeros
10000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999990000 All Zeros	99999990000 All Zeros
100000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999900000 All Zeros	99999900000 All Zeros
1000000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999999000000 All Zeros	99999000000 All Zeros
10000000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999990000000 All Zeros	99990000000 All Zeros
100000000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999900000000 All Zeros	99900000000 All Zeros
1000000000	Rep. Mult. Neg. Mult. Accum. Mult. Clear Rep. Mult.	99999999999000000000 All Zeros	99000000000 All Zeros

FRIDEN CALCULATING MACHINE TEST

ITEM 11 OPERATING BARS

Depress each of the following Controls several times and check for sticking, touching cover slots, proper operation, etc.:

Plus Key
Minus Key
Enter Div'd
Mult.
Mult. Clear
Left Shift
Right Shift
Add Key
Neg. Mult.
Accum. Mult.
Left Div.
Stop Key
Right Div.
Both Div.
Carr. Clear
K. B. Clear
K. B. Lock
Counter Control
Mult. Non-Entry
Repeat Mult.

Depress each Tabulating Key from one to eight, making sure that each key remains down and restores the key which was already down. Starting with the Zero Tab. Key, depress Enter Div'd Key and check for the proper Carriage Tabulation; then the #1 Tab. Key, #2 Tab. Key, etc., until all Tab. Keys are checked for proper operation and proper Dividend entry.

Work any Multiplication problem to prove proper action of Multiplier Keyboard, Multiplier Correction Key, Accumulative Multiplier Key, Negative Multiplier Key, and Repeat Multiplication.

ITEM 12 CARRIAGE SHIFT

Using the Shift Keys, make sure the Carriage shifts freely into each position, both from Left to Right and from Right to Left. Make sure the Shift Keys do not bind, rub on the cover, etc. Hold the Keys down and also use individual depressions.
Work any 10 digits in Keyboard by 10 digit Multiplier and check for proper Automatic Carriage Shift. Work any 20 digits by 10 digits in Division and check for proper Automatic Carriage Shift, both to the Right and Left.

ITEM 13 POWER SHIFT ACT. MECH.

Shift the Carriage to the extreme Right. Check for the proper operation of the Power Shift Actuating Mechanism by depressing the Carriage Clear Key. Observe that the Carriage begins to shift on the second cycle of the machine. If the Carriage is hesitating at the start or skips a shift now and then, this denotes that the Power Shift Actuating Mechanism is not latching or is not functioning properly. Test this action on each operating Key which returns the Carriage to first position.

ITEM 14 AUTO. CARRIAGE CLEAR

Enter figures into the Upper and Lower Dials. Shift the Carriage to the right, depress the Carriage Clear Key. Observe the proper clearance of the Dials when the Carriage returns to first position. Test with the Multiplier Key also.

ITEMS 15-16 CARRIAGE CLEAR RACKS & SPLIT & NORMAL CLEARANCE

Try Optional Clear and Split Clear Knobs in both positions and check for freeness, proper detent action, rubbing on Cover, etc. Manually clear the Dials; check for proper clearing action. All Upper Dials should clear when the Left Half of Clear Rack is locked in, but only to the position of the Split (7th, 8th, 9th) if Left Half of the Clear Rack is not locked in.

FRIDEN CALCULATING MACHINE TEST

ITEMS 17-18-19 ENTER DIVIDEND: DIVISION ALIGNMENT: DIVISION

Work the following problems, and check the action of Enter Dividend, the proper Entry and the Division results. Check that the Division Aligner functions properly by shifting the Carriage back to position #1 after each Enter Dividend operation and before depressing the Division Keys. The Carriage should automatically shift to the right until the figures are aligned.
Use #9 Tab. Key first, then #8, #7, etc. to test in all Carriage positions.

KEYBOARD	DEPRESS	UPPER DIALS	LOWER DIALS
8888888888	Div. Tab.	8888888888000000000	
	Left Shift		
9999999999	Both Div.	8888888888	888888888
7777777777	Div. Tab.	7777777777000000000	
	Left Shift		
9999999999	Both Div.	7777777777	777777777
6666666666	Div. Tab.	6666666666000000000	
	Left Shift		
9999999999	Both Div.	6666666666	666666666
5555555555	Div. Tab.	5555555555000000000	
	Left Shift		
9999999999	Both Div.	5555555555	555555555
4444444444	Div. Tab.	4444444444000000000	
	Left Shift		
9999999999	Both Div.	4444444444	444444444
3333333333	Div. Tab.	3333333333000000000	
	Left Shift		
9999999999	Both Div.	3333333333	333333333
2222222222	Div. Tab.	2222222222000000000	
	Left Shift		
9999999999	Both Div.	2222222222	222222222
1111111111	Div. Tab.	1111111111000000000	
	Left Shift		
9999999999	Both Div.	1111111111	111111111

FRIDEN CALCULATING MACHINE TEST

ITEM 20 AUTOMATIC TRANSFER

Work the following problem to test the transfer action. Other problems may also be used.

MNE down. Add Key down. Counter Clear and set in non-clearing position.

KEYBOARD	MULTIPLIER KEYBOARD	DEPRESS	UPPER DIALS	LOWER DIALS
0000137000	2400	MULT. KEY	3288	ZERO
		BOTH TRANSFER KEYS	ZERO	3288
0000203000	5400	MULT. KEY	10962	3288
		BOTH TRANSFER KEYS	ZERO	14250
0014250000	07	MULT. KEY	9975	14250
		NEG. TRANSFER KEY	ZERO	13253

Test that the Selection Lever, which operates the transfer, restores after the operation. Do this by depressing the Plus and Minus Key after the Transfer Action, both Negative and Positive Transfer.

ITEM 21 MULTIPLIER KEYBOARD

Check for the proper action of the Selection Keys; the Sector releasing; the Pins setting; the time of Carriage escapement.

FRIDEN CALCULATING MACHINE TEST

ITEMS 22-23-24 **AUTO. MULTIPLIER: MULTIPLIER CLEAR: REPEAT MULT.**
Work the following Multiplication test by using the Repeat Key.

ADD KEY UP
SET 1111111111 ON KEYBOARD, LOCK IN

MULTIPLIER KEYBOARD	DEPRESS	UPPER DIALS	LOWER DIALS
1212121212	Rep. Mult.		
	Mult. Key	1346801346531986532	1212121212
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
2323232323	Rep. Mult.		
	Accum. Mult.	2581369247519640853	2323232323
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
3434343434	Rep. Mult.		
	Mult. Key	3815937148507295174	3434343434
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
4545454545	Rep. Mult.		
	Accum. Mult.	5050505049494949495	4545454545
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
5656565656	Rep. Mult.		
	Mult. Key	6285072950482603816	5656565656
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
7878787878	Rep. Mult.		
	Mult. Key	8754208752457912458	7878787878
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		
8989898989	Rep. Mult.		
	Accum. Mult.	9988776653445566779	8989898989
	Neg. Mult.	All Zeros	All Zeros
	Clear Rep. Mult.		

FRIDEN CALCULATING MACHINE TEST

ITEM 25 SW - MULT. SETTING KEY

Work any multiplication problem by using the Mult. Setting Lever in all three positions. See that it restores properly and that the right multiplication is performed in each position.

ITEM 26 M. N. E.

Work any multiplication problem with the MNE down. Check that the Counter Dials do not rotate. Divide out and check that the Counter Dials do rotate.

ITEM 27 HALF CENT AND FRACTIONAL

Place all 9's in Keyboard. With Add Key up, depress Plus Key once. Turn all three Clear Knobs to non-clearing position. Place "1" in Multiplier Unit. Pull Repeat Key down. Depress Multiplier Key, then Negative Multiplier Key. The first and last Dials with numbers should change. Others show 9's.

Clear the Carriage in First position. Set 5's in all Half Cent or Fractional Dials. Observe that the Setting Twirler drops into position properly. Set "1" in Column 1 and depress the Division Keys. Observe that the Carriage aligns and divides out. Try this test with other figures in Fractional Dials.

ITEM 28 SRW

See tests on Pages 32 and 33, SRW Manual.

ITEM 29 AUTO. DIVISION STOP

With the #9 and #8 Tab. keys depressed, divide all 9's by 1's. The Carriage should stop automatically at the 8th position. Continue the test by depressing the #8 and #7 Tab. Keys and divide 8's by 1's. The Carriage should stop automatically at the 7th position. Continue test by using Tab. keys 7 & 6, 6 & 5, 5 & 4, 4 & 3, 3 & 2, 2 & 1.

ITEM 30 INTERLOCKS

Test Interlocks by attempting to depress other operating keys during any operation.

ITEM 31 SPRINGS

Record under this Item any difficulty caused by a faulty spring. Record unhooked springs, ruptured springs. Record by part number. Return damaged springs attached to Form 73-7.

ITEM 32 BROKEN PARTS

Record under this Item any part that may be found broken. Record by part number. Return the parts attached to Form 73-7.

ITEM 33 BINDING PARTS

If it is necessary to remove the covers, check the machine carefully for binding parts. Be specific when reporting such conditions by giving the proper numbers and locations of the parts in the machine. The reason for this condition can then be traced.

ITEM 34 SCREWS & PINS

If it is necessary to remove the covers, check the machine carefully for loose screws, taper pins, nuts, clips, shavings, or other evidence of careless workmanship. Be specific when reporting such conditions by giving the proper number and locations of the parts in the machine. The reason for this condition can then be traced.

ITEM 35 LUBRICATION

If it is necessary to remove the covers, check and note that all parts requiring lubrication are properly lubricated. Record under this Item any discrepancy caused by improper lubrication.

FRIDEN CALCULATING MACHINE TEST

ITEM 36 **DAMAGED IN SHIPMENT**

Record under this Item any damage to the machine which might be due to rough handling, improper packing, or inadequate protection. If there is damage to the machine, always make a claim on the local office of the shipping company. Do this without delay. Record, also, any parts that may be found disengaged.

ITEM 37 **OTHER**

Record under this Item any other discrepancies that are found which do not come under the Items listed.

LUBRICATION

A most important function in servicing a machine is proper lubrication. Many machine troubles can be traced to poor lubrication. Too much and too little are both bad conditions and are to be avoided. Too much lubrication may create a condition that causes sluggish action of parts that are actuated by springs and, in addition, serves to collect dirt and dust. Use only one drop of oil in a bearing, as this is sufficient for proper lubrication and is all the bearing will retain. Use grease sparingly to prevent smearing adjacent parts that would become sluggish if grease is allowed to get on them.

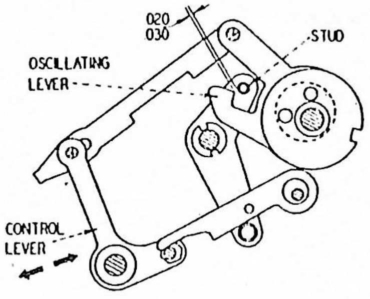
All moving parts of a machine should have some lubrication except where adhesion is a factor. Some parts should be lubricated very sparingly or not at all because oil may create a suction between parts that slide on flat surfaces. When this condition is found, the parts should be flushed with solvent and left to dry.

OIL AND GREASE: Refer to Friden Service Bulletins for the type to use.

A good guide for determining where to use Grease is to duplicate the use of grease on parts as lubricated by the factory.

At the end of many of the adjustment explanations there are notations indicating whether to grease or oil the parts. These notations serve as reminders. Some adjustments do not have these notations, but their absence does not indicate the parts are not to be lubricated.

5-15-57	Remove and Destroy Pages 33 and 33A Insert This Page	Revision 1



STW - ACG - SW - CW - DW - SRW

ADJ. 26B POWER SHIFT - INITIAL POSITIONING OF OSCILLATING LEVER: Depress the Plus Key and rotate the Drive Shaft by hand crank until the Oscillating Lever is at its closest position to the Stud. Measure for .020 to .030 clearance. Adjust by forming the Control Lever. (By removing the Keyboard, the Control Lever can be reached.)

Reason for Adjustment: This positions the Oscillating Lever for proper engagement with the Stud when the Operating Keys are depressed and the Drive Shaft rotates.

Oil all bearings.

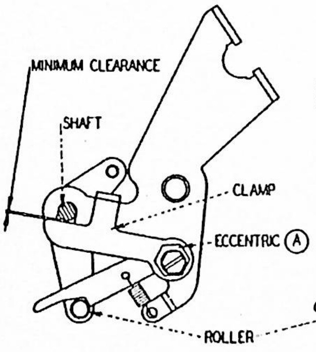


FIG. I

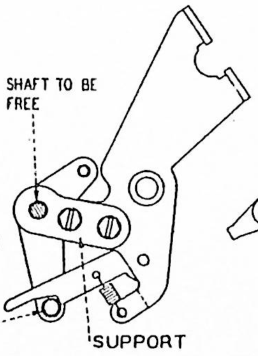


FIG. 2

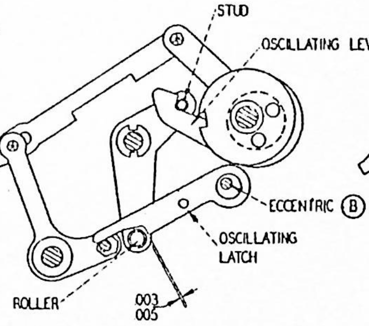


FIG. 3

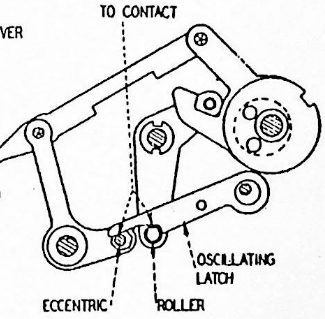


FIG. 4

STW-ACG-SW-CW-DW-SRW

ADJ. 26C, REV. 2 - POWER SHIFT - ADJUSTMENT OF OSCILLATING LEVER:

Fig. 1: Adjust the Clamp by Eccentric A for minimum clearance to Clear Levers Shaft or adjust the Support, Fig. 2, so the Shaft is free. Fig. 3: Test the overthrow of the Roller to the Oscillating Latch by depressing each Control Key (Enter Div'd, Carriage Clear, all Multiplier Keys) and rotating the Drive Shaft by Hand Crank until the Oscillating Lever is on the high point of the Stud. Adjust Eccentric B with the lobe down to give a .003- 005 overlatch of the Oscillating Latch to the Roller. This would be on the Operating Key which causes the least movement of the Roller. Fig. 4: Using the Enter Dividend Key when the Oscillating Lever is away from the Stud, the Oscillating Latch is to contact the Roller and the Eccentric Stud. Adjust the Eccentric Stud. (This adjustment is applicable on machines without the parts per Adj. 33. On machines with these parts a clearance of .000-.020 may be necessary to insure the delatching of the Oscillating Latch on a retarded release of the Enter Dividend Key.)

Reason for Adjustment Fig. 1 and 2; to prevent movement of Shaft and Roller during Carriage Clear. Fig. 3 and 4; to insure the holding of the Roller thus keeping all parts in position that are actuated by the action of the Oscillating Lever.

ADJUSTMENTS

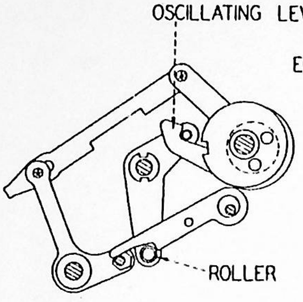


FIG. 1

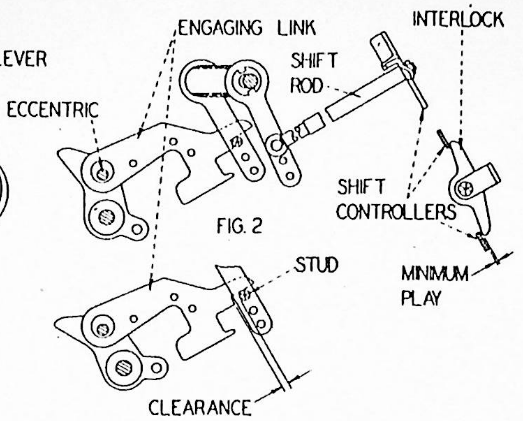


FIG. 2

FIG. 3

STW - ACG - SW - CW - DW - SRW

ADJ. 26D SHIFT ENGAGING LEVERS - LEFT SHIFT: Fig. 1. Depress the Enter-Dividend Key and rotate the Drive Shaft by hand until the Oscillating Lever has caused the Roller to reach its maximum throw. Fig. 2. Adjust the Engaging Link Eccentric with its high side up to position the Left Shift Rod to the rear so there is minimum play of the Interlock between the Shift Controllers. When the Enter-Dividend Key is restored, the Engaging Link is to restore with clearance to the Stud. Fig. 3.

Oil all bearings: Shift Rod, Engaging Link, etc.

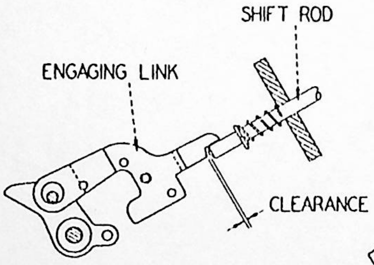


FIG. 1

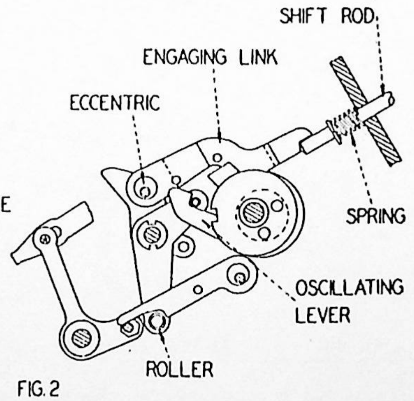
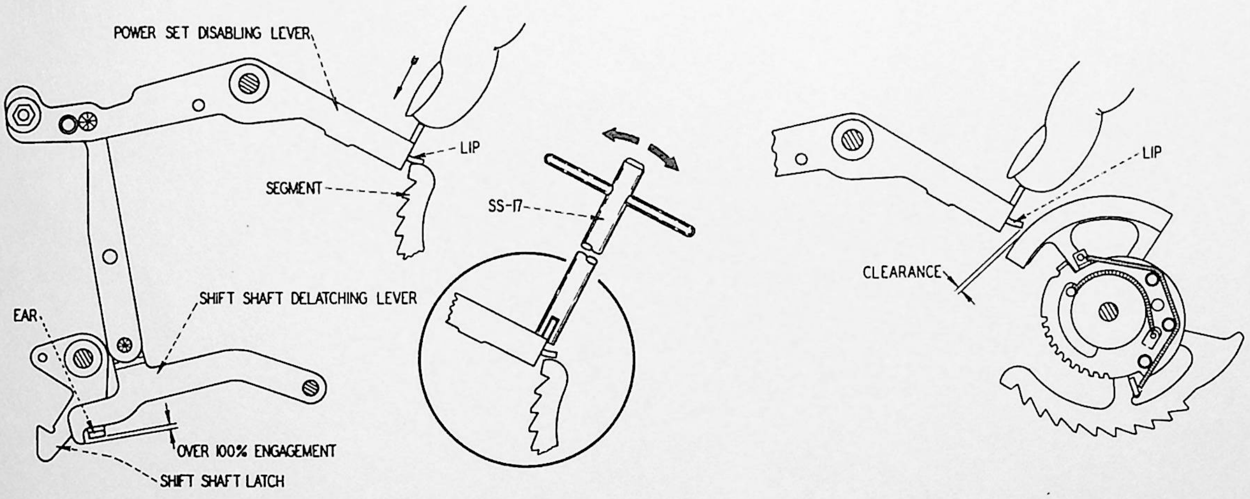


FIG. 2

STW - ACG - SW - CW - DW - SRW

ADJ. 26E SHIFT ENGAGING LEVER - CARRIAGE CLEAR: Fig. 2. Depress the Enter Dividend Key and rotate the Drive Shaft by hand until the Oscillating Lever has caused the Roller to reach its maximum throw. Adjust the Engaging Link Eccentric so the Carriage Clear Shift Rod is fully positioned to the rear. Do not adjust the Eccentric so that it will compress the Spring but will leave a slight amount of end play in the Shift Rod. When the Enter Dividend Key restores, the Engaging Link is to restore with clearance to the end of the Shift Rod, Fig. 1.

Oil all bearings: Shift Rod, Engaging Link, etc.

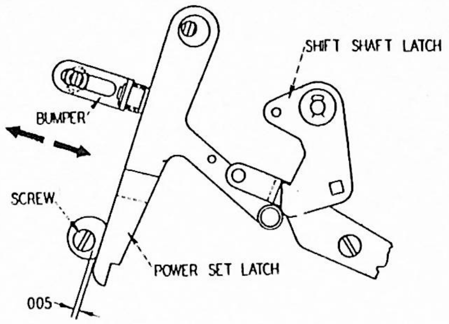


ST - S - STW - ACG - SW - SRW

ADJ. 62A Rev. 1 POWER SET DISABLING LEVER LIP: Place zeros in the Unit and press the Lip of the Disabling Lever against the Segment. The Shift Shaft Delatching Lever is to have over 100% engagement with the Ear of the Shift Shaft Latch. Form the Lip per inset. After forming, select 9's and depress the Neg Mult Key. Press down on the Disabling Lever. The Lip should clear the numbered part of all Segments.

Reason for Adjustment: To insure sufficient engagement of the Delatching Lever with the Ear when the Sector is fed to zero. Insufficient engagement will cause the Delatching Lever to be pulled over the top of the Ear and cause it to jam on the front side.

12/15/58	Destroy Page 95 No Revision	Insert this Page	Revision 1



ST-S-STW-ACG-SW-SRW

ADJ. 64 POWER SET LATCH BUMPER: Manually delatch the Shift Shaft Latch and adjust the Bumper to stop the Power Set Latch about .005 from contacting the Screw.

Reason for Adjustment: Prevent noise. Also if the Power Set Latch is stopped too early, the travel of the Shift Shaft will be restricted and a failure of shift may occur.

(ADJ. 65 DELETED)

Rev.

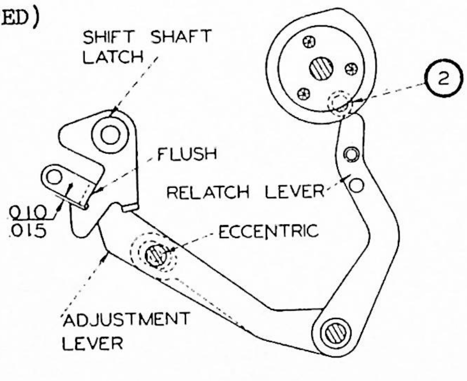


FIG 1

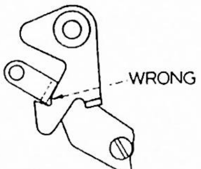


FIG. 2

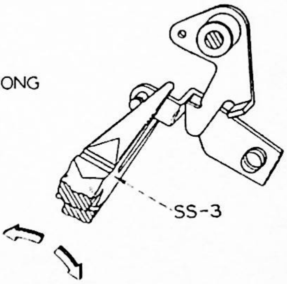
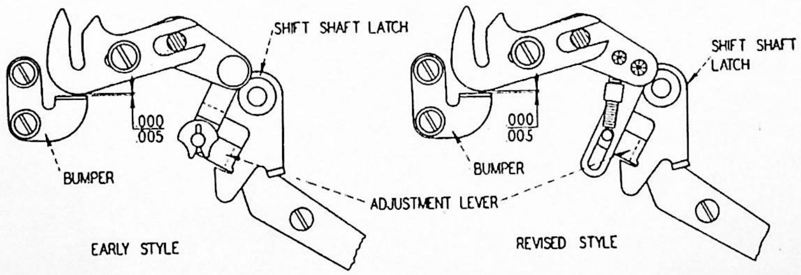


FIG 3



EARLY STYLE

REVISED STYLE

ST-S-STW-ACG-SW-SRW

ADJ. 66A Rev. 1 POWER SET LATCH RELEASE LEVER RELATCHING: (1) Release the Clutch and rotate the Drive Shaft by hand until Roller 2 is on the high point of movement with the Relatch Lever. The Adjustment Lever is to overlatch the Shift Shaft Latch by .010 - .015. Adjust at the Eccentric. The Shift Shaft Latch is to rest flush against the end of the Adjustment Lever, Fig. 1 - not as illustrated in Fig. 2. To align, twist with SS-3, Fig. 3. Whenever this adjustment is changed, check Adj. 66B.

(2) Stabilizer Bumper: Release the Clutch and cycle the Drive Shaft by hand until the Adjustment Lever has reached its maximum overlatch. Form the Bumper for .000 - .005 to stabilizer.

ADJUSTMENTS

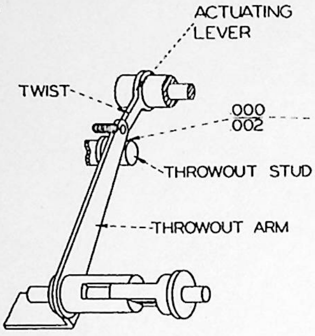


FIG. 1

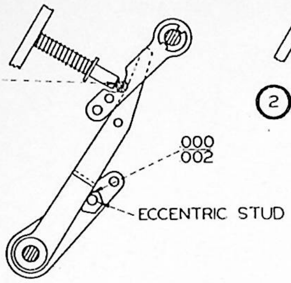


FIG 2

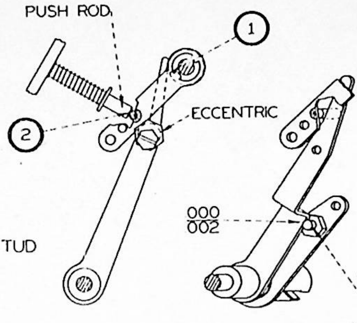
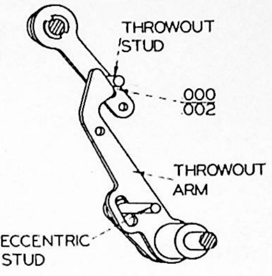


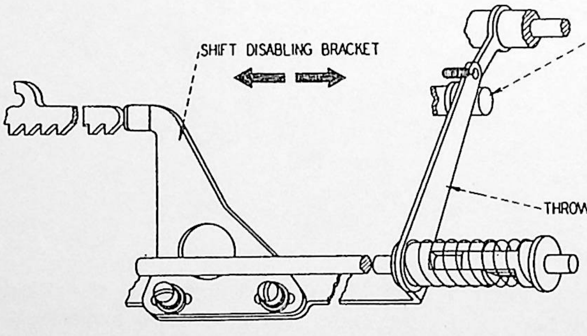
FIG 3

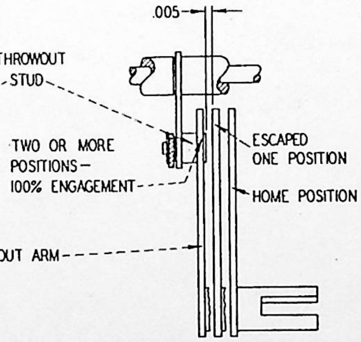


ST - S - STW - ACG - SW - SRW

ADJ. 66B CARRIAGE SHIFT THROWOUT ARM: Select two or more figures in the Unit to position the Carriage Shift Throwout Arm over the Throwout Stud. There is to be .000 - .002 clearance. Fig. 1, Gray Line Style. Twist the Actuating Lever. Fig. 2, Early "W" Line Style. Turn the Eccentric Stud. Fig. 3, Revised "W" Line Style. 1st - Adjust Eccentric to remove play between Points 1 and 2. Do not move the Push Rod to the rear. 2nd - Adjust the Eccentric Stud. Fig. 4, Second Revised "W" Line Style. Turn the Eccentric Stud.

Reason for Adjustment: To remove all excess play to insure a shift cycle. Too much play will cause a delay in actuating the Push Rod.





ST - S

FIG. 1

FIG. 2

ADJ. 66C CARRIAGE SHIFT THROWOUT - GRAY LINE: Fig. 2. When the Unit is escaped one position, the Throwout Arm is to clear the Stud at least .005 and when escaped two or more positions the Throwout Arm is to be 100% on the Throwout Stud. Adjust by moving the Shift Disabling Bracket, Fig. 1. (For 'W' Line Adjustment, see Adj. 70F.)

Reason for Adjustment: To insure that a Carriage Shift does not occur with the Unit escaped one position.